

SSUR Team Membership and Biographies

Internal Members

Rita Willcoxon (*Team Lead*) KSC
 Mary Sharpe (*Technical Asst.*) KSC
 Michele Brekke – JSC
 Todd Corey – KSC
 Dr. Gary Jahns – ARC
 Barbara Kreykenbohm – HQ-UM
 Dr. Feng Liu – JPL
 Stan Nichols – HQ-OSF
 Ron Porter – MSFC
 Lesa Roe – JSC
 Russell Romanella – KSC
 Dawn Schaible - KSC
 Tom St. Onge – GRC
 Teresa Vanhooser – MSFC

External Members

Dr. Dan Mulville, *Lead*
 John Conway
 Joe Cremin
 Dr. Charles Fuller
 Dr. Albert Sacco Jr.
 Richard Swalin

Ex-Officio Members

Eve Lyon – HQ Legal
 Dave Beck – HQ Procurement

Michele A. Brekke

Ms. Brekke received a B.S. degree in Aerospace Engineering and Mechanics in 1975 from the University of Minnesota. In 1977, she received an M.S. degree in Aerospace Engineering and Mechanics also from the University of Minnesota. She completed the Texas Executive Education Certificate Program in General Management at the University of Texas in 2003. Ms. Brekke began her career with NASA at the Johnson Space Center in 1977 as a Space Shuttle instructor to the astronauts and mission controllers. She specialized in ascent/entry guidance, navigation and flight control. She became a Payload Officer in Mission Control in 1982. She coordinated the activity of the payload team during pre-mission planning and development and led the team during real time operations. She was a Payload Officer on several missions, and was the Lead Payload Officer on STS-51G. In 1985, Ms. Brekke was selected as a Space Shuttle Flight Director, with the responsibility of directing pre-mission planning and real time operations of the mission control team. In 1988, Ms. Brekke joined the Space Shuttle Program and held progressively responsible positions including Payload Integration Manager and Assistant Mission Manager for the First Hubble Space Telescope repair mission. In 1994, she was selected to lead the Space Station Utilization Office. As the Space Station Utilization Manager, she led all activities (including cost, schedule and technical) associated with the development and implementation of Space Station utilization plans and processes. Following restructuring of the Space Station Program, Ms. Brekke moved to the Space Shuttle Program and was selected as a Flight Manager in 1997. As a Flight Manager, Ms. Brekke led the Flight Integrated Product Teams in the mission integration process and made the day-to-day decisions for assigned flights. She managed six flights including STS-85, 89, 92, 93, 95 and 99. In 2001, she was selected to lead the Customer and Flight Integration office in the Space Shuttle Program. As the manager of this office, Ms. Brekke leads the team that negotiates and integrates payload and mission requirements and defines the Space Shuttle manifest.

Appendix A

John T. Conway

John T. Conway has been a private consultant to a number of aerospace companies since 1996, and supported the ISS Operations Architecture Study. As a former NASA Director of Payload Processing at KSC, he managed a 2400-person Government/contractor team for Space Shuttle payload processing and served as Technical Manager of the Payload Ground Operations Contract. In this capacity, Mr. Conway worked closely with payload customer teams throughout NASA and the world and with payload-to-carrier and payload-to-launch vehicle integration processes. His responsibilities included developing the KSC launch site capability to test and integrate elements and payloads of the ISS, and NASA oversight of expendable launch vehicles and systems, including the launch decision. He was a key interface and team member with international mission management and science teams worldwide. Mr. Conway has demonstrated capability in establishing positive customer partnerships with a widely diverse customer base, as well as in-depth experience in managing a large organization engaged in advanced technology, high risk, and high visibility programs. Previously, Mr. Conway served as Director, Information Systems, and was responsible for developing, installing, and operating computer, communications, and instrumentation systems used for preflight preparation, testing, checkout, and launch of the Space Shuttle. Mr. Conway has a B.S. in mathematics from Florida State University and an M.A. in mathematics from the College of William and Mary. He has been awarded NASA's Exceptional Service Medal, three NASA Outstanding Leadership Medals, the 1990 Presidential Meritorious Executive Award, and the 1995 Presidential Distinguished Executive Award

Todd R. Corey

Mr. Corey began his tenure at Kennedy Space Center (KSC) in 1988 with the Payloads Processing Directorate, performing payload ground processing activities. From 1988 to 1994 he served as a Senior Mission Operations Engineer, coordinating and planning activities for the assembly and checkout of payloads flying on the Space Shuttle. From 1994 to 1997 he was the Payload Multiflow and Long Range Planning Manager, responsible for assessing KSC Payloads ability to support the flight manifest, and determining the most efficient use of payload and processing facility assets. Since 1997 Mr. Corey has been a Mission Manager, leading KSC Mission Processing Teams preparing payload hardware for flight on the Space Shuttle and International Space Station. Prior to joining NASA, Mr. Corey was a reliability and maintainability engineer with the Department of the Air Force between 1985 and 1988. He received a B.S. degree in Aerospace Engineering and Mechanics from the University of Minnesota in 1985.

Joseph W. Cremin

Mr. Cremin was NASA's Mission Manager for Spacelab J (SL-J), launched in 1992, and Spacelab 3 (SL-3), launched in 1985. For these Spacelab missions, Mr. Cremin managed and directed all payload engineering, operational and programmatic activities; the activities of U.S. and Japanese scientists, experts in industry, universities and other Government agencies for the development and integration of resources and interface requirements for assigned payloads. As NASA's Launch Services Agreement Technical Manager with the National Space Development Agency (NASDA) of Japan, he

negotiated and established agreements and budgets governing interagency operations relative to the mission; establishing, controlling, and managing schedules and two distinct budgets exceeding 30 million dollars. As Mission Manager, Mr. Cremin gained intimate familiarity with Space Shuttle and Spacelab integration, launch site payload processing, the flight and ground safety process and, uniquely, the interaction of their derived requirements on payload hardware design, ground and flight operations planning and the integrated mission. His experience was garnered from when the Spacelab and Shuttle were in development and integration requirements were maturing, to when they approached operational status. This experience, developed in a previous era, is directly applicable to the SSUR team challenge. Mr. Cremin served as a member of the Post-Challenger NASA Flight Safety Panel, and on various nonadvocate and oversight committees for NASA flight research projects. After retiring from NASA, Mr. Cremin worked for Computer Sciences Corporation, supporting teams that were successful in winning two multi-year, multi-billion dollar outsourcing contracts in Information Technology with Pratt & Whitney and E.I. Dupont. Mr. Cremin has a Bachelor of Aeronautical Engineering and a Masters in Aerodynamics conferred by the Georgia Institute of Technology in Atlanta, Georgia. Through out his career, Mr. Cremin has earned numerous awards including the Exceptional Service Medal, Silver Snoopy and incentive and outstanding performance awards.

Dr. Charles A. Fuller

Dr. Fuller received a Doctor of Philosophy in Physiology from the University of California, Davis. Currently, Dr. Fuller is the Chair of the Exercise Biology Program and Professor of Neurobiology and Physiology at the University of California, Davis. Dr. Fuller is also the Director of the Chronic Acceleration Research Unit, which has a forty-year history of research in gravitational physiology. He maintains an active research program investigating the effects of gravity on living systems. His areas of specialization include the effects of gravity on the regulation of circadian rhythms, energy balance, metabolism and obesity. He has been a NASA-funded investigator since 1979 and has been a Principal Investigator on life science experiments flown on the Space Shuttle, Russian biosatellites, and MIR. He has served as both a chair and member of numerous NASA Advisory Committees including Space Station Utilization, Variable Gravity Centrifuge Facility, Life Science, and Life and Microgravity Sciences committees. Dr. Fuller is the current Editor-in-Chief of the *Journal of Gravitational Physiology*. He is the current President of the American Society for Gravitational and Space Biology and a member of the Council of Trustees of the International Society for Gravitational Physiology.

Dr. Gary Jahns

Dr Jahns received his B.S. in Zoology From Texas Tech University in 1973, M.S. in Botany from Texas Tech University in 1976, and Ph. D In Botany From Miami University In 1983. His career with NASA began as a NASA Post-Doctoral Research Associate at the University of Houston 1983 working with Dr. Joe Cowles on a series of experiments to determine the effects of microgravity on the growth and lignification in young seedlings. In 1987 he joined the Life Sciences Payloads Office (SLSPO) at NASA Ames Research Center as a Plant Physiologist. His first assignment was as SLSPO liaison

Appendix A

to the LifeSat Project with the responsibility to develop the LifeSat Botany Module Science Requirements Document, and plausible experiment scenarios and science support cost estimates for the project. Since that time he has served in several different roles more notably as SLS- 1 Payload Scientist from 1989 to 1992 and as the Phase 1a Shuttle/Mir Payload Manager from January of 1993 through August of 1995 and was awarded NASA's Exceptional Service Medal, in 1992 for his effort on SLS-1. In 1997 he joined the Fundamental Space Biology Program Office as Deputy Program Manager for Space Flight Research. In this capacity he is responsible for program formulation, development, assessment and oversight, advocacy and integration, and for administering the Headquarters guidelines and controls under which its composite projects and activities are implemented.

Barbara S. Kreykenbohm

Barbara Kreykenbohm is a Mission Planning and Integration Manager in the NASA Headquarters Office of Biological and Physical Research (OBPR), Mission Integration Division. Her special assignment to the Station and Shuttle Utilization Reinvention Team was preceded by special assignments with the NASA Utilization Management Concept Development Team and two sessions as a Congressional legislative aide, one with Senator Maria Cantwell and one with Congressman Bart Gordon. Previously, she managed Space Product Development programs for OBPR and Space Station utilization requirements for the Office of Space Access and Technology. In earlier assignments at NASA Headquarters, she managed concept development programs including the Orbital Transfer Vehicle and the Assured Crew Return Vehicle. Ms. Kreykenbohm came to NASA Headquarters from Marshall Space Flight Center where she began her career as a research chemist in the Space Sciences Laboratory. Prior to her NASA career she taught physics at Virgil I Grissom High School in Huntsville, Alabama.

Dr. Feng-chuan Liu

Dr. Feng-chuan Liu received his PhD in Low Temperature Physics in 1992 from the University of Washington. From 1992 to 1995, he was a postdoctoral research associate at the University of California, Santa Barbara working on a NASA-sponsored research project to study non-equilibrium behaviors in Superfluid Helium. In 1995 he moved to the Jet Propulsion Laboratory and continued his research as a National Research Council Associate. From 1996 to 2000, he was the Project Scientist for the Critical Dynamics in Microgravity (DYNAMX) Experiment, and for the Low Temperature Microgravity Physics Facility (LTMPF) Project. Since 2000, he has been the Contract Technical Manager and the Deputy Project Manager for the LTMPF Project. He is a Co-Principal Investigator of the Boundary Effects on the Superfluid Transition (BEST) Experiment, and a co-investigator of the DYNAMX Experiment; both investigations are scheduled to be conducted in the LTMPF on the International Space Station. He has authored and co-authored more than 35 papers in peer-reviewed scientific journals. He has been a member of the American Physical Society since 1987.

Dr. Daniel R. Mulville

Dr. Mulville served as the Associate Deputy Administrator of the National Aeronautics and Space Administration from 2000 to 2003. He was the senior advisor to the

Administrator and was responsible for planning, directing, and managing the daily operations and transformation activities of the Agency. During November and December of 2001, he served as the Acting Administrator during the transition of administrations. Prior to this assignment, Dr. Mulville served as NASA's Chief Engineer from 1995 to 1999. He was responsible for the overall review of the technical readiness and execution of all NASA programs. He provided an integrated focus for Agencywide engineering policies, standards, and practices. Dr. Mulville also served as NASA's Deputy Chief Engineer and ensured that development efforts and mission operations were conducted on a sound engineering basis. From 1990 to 1994, Dr. Mulville was the Director of the Engineering and Quality Management Division in the Office of Safety and Mission Assurance at NASA Headquarters. In that position he was responsible for development of NASA's engineering and quality assurance standards and procedures related to design and development of spacecraft and aeronautics systems. Dr. Mulville also served as the Deputy Director of the Materials and Structures Division in the Office of Aeronautics and Space Technology at NASA Headquarters. He managed the Advanced Composites Technology Program, and materials and structures elements of the Advanced Launch Systems, Space Exploration Initiative, and the High Speed Civil Transport programs.

Stanley R. Nichols

Mr. Nichols joined NASA in 1981 under the Presidential Management Intern Program. He has held numerous positions at NASA HQ. He was responsible for implementation of grants to educational institutions and developed HQ support contracts as part of the HQ Procurement organization. As a Policy Analyst in the Office of Space Flight Customer Services Division he was involved in the development of Shuttle utilization and reimbursement policies specifically Spacelab, Payload Specialists on board the Shuttle, retrievable payloads and optional services pricing. He was also the Commercial Liaison Officer in the HQ Office of Commercial Programs. In this role, he served as liaison with commercial users of the Shuttle and its operating elements to ensure that all parties understood and complied with terms and conditions of joint NASA-commercial agreements. Currently, Mr. Nichols is the HQ OSF interface for payload customers of the Shuttle and ELV Programs. He serves as the liaison to Office of Biological and Physical Research and Office of Earth Science for provision of launch services. He also has oversight responsibility for OSF managed secondary payload carriers on the Space Shuttle. Mr. Nichols holds two Bachelor of Science degrees in Biological Science and Zoology from University of California Davis, and Fisheries Science from Oregon State University. He has an MBA from the University of Oregon.

Ronald F. Porter

Mr. Porter received his Bachelor of Science in Mechanical Engineering from the University of Tennessee in 1982. Mr. Porter joined the NASA team in 1979 as a cooperative engineering student at the Marshall Space Flight Center. He returned full time in 1982 as a systems test engineer. From 1982 to 1987, he served in a variety of positions including Lead Systems Engineer and Lead Test Engineer for multiple scientific payloads. Mr. Porter was also assigned as flight crew trainer and air-to-ground communicator for the Spacelab-3 mission. From 1987 to 1993, he served as MSFC Lead Engineer for a number of Shuttle, Russian space station Mir, and International Space

Appendix A

Station (ISS) science payload projects. In addition, he served as a Co-Investigator for a Spacelab experiment in dendrite formation in metals. In 1993, at NASA Headquarters, he worked as the Assistant Program Manager for Biotechnology and was responsible for the manifesting of all microgravity science payloads. When he returned to MSFC, he became the head of a project office responsible for defining and developing multiple science instruments including all biotechnology payloads, the microgravity glovebox facilities for Mir and ISS, and the Mechanics of Granular Materials, among others. In addition, he served as the Program Manager for NASA's Biotechnology Program. Mr. Porter currently is the Group Lead for Microgravity Science Planning and Program Management in the Science Directorate at Marshall Space Flight Center. Over the years, he has earned numerous awards, including the Silver Snoopy award, an Exceptional Achievement Medal, two Center Director's Commendations, and a plethora of group achievement and special service awards.

Lesla B. Roe

Ms. Roe has over eighteen years experience in engineering technical and managerial positions, working for both Government and private industry; including four years of International Space Station Program Management, nine years of experience in Technical Management and Project Engineering, and five years of experience in RF Communications Test and Payload Systems Engineering. Ms. Roe started her engineering career performing satellite communications analysis for Hughes Space and Communications in El Segundo, California. Ms. Roe started her career at NASA at Kennedy Space Center in 1987 as a Shuttle RF Communications Engineer in the Space Shuttle Engineering Directorate. From 1990 through 1999 she managed multiple payloads through KSC processing in the Payload Processing Directorate and International Space Station Hardware Integration Office. From 1999 through 2003, Ms. Roe managed the International Space Station Payloads Office at Johnson Space Center responsible for development, integration, and on-orbit operations of International Space Station research and technology payloads. In August 2003, Ms. Roe was assigned as Associate Center Director at Langley Research Center responsible for all business functions at the Center. Ms. Roe has a Bachelors of Science in Electrical Engineering from the University of Florida, a Masters of Science in Electrical Engineering from the University of Central Florida, and Executive Management Development Programs at University of Michigan and Smith College. She has received numerous awards during her career including a NASA Superior Accomplishment Award, NASA Continuous Improvement Award, NASA Exceptional Service Medal, Certificate of Commendation, Outstanding Performance Awards, and a nomination for a 2003 Rotary Stellar Award.

Russell Romanella

Mr. Romanella joined NASA in 1981 in the Space Shuttle Processing Directorate. From 1985 through 1996 he managed multiple Information Technology projects supporting Shuttle and Payload processing at the Kennedy Space Center. In 1996 he joined the International Space Station (ISS) Hardware Integration Office (SSHIO) as Element Manager for ISS missions including the Multi-Purpose Logistics Modules (MPLM) and the Canadian Robotic Arm. In 2000, Mr. Romanella served as the Deputy Director of the Space Station Hardware Integration Office where he was responsible for International

Space Station (ISS) component processing at KSC and contractor manufacturing locations. In May of 2001, Mr. Romanella became Deputy Director for Program Management in the ISS / Payload Processing Directorate. In this, his current position, Mr. Romanella is responsible for plans, processes, and operating philosophies of the ISS and Shuttle Payloads ground operations. He is responsible for long-range multi-year work plans of the subordinate divisions and offices and provides direction to the Checkout, Assembly and Payload Processing Services (CAPPS) contractor. Mr. Romanella graduated from Florida State University with a B.S. in Mathematics. He has received the Space Flight Awareness Award and over 25 Performance Awards including Numerous KSC and NASA group achievement awards, Silver Dollar Award, Certificates of Appreciation, the NASA Exceptional Service Medal, and the Center Director's Award.

Dr. Albert Sacco, Jr.

Professor Sacco is presently the George A. Snell Distinguish Chair of Engineering at Northeastern University in Boston Massachusetts. He was granted a Doctor of Philosophy in Chemical Engineering from MIT, and was awarded three other honorary doctorates for his achievements in engineering and science. Dr. Sacco is the director of the Center for Microgravity Materials Processing a NASA Research Partnership Center at Northeastern University, as well as a faculty member in Chemical Engineering. He has authored over 200 archival papers and conference proceedings in the areas of catalyst deactivation, zeolite synthesis, and microgravity materials processing. He has given over 500 professional presentations. He was an alternate Payload Specialist on STS-50, and a Payload Specialist on STS-73. He has been the Principle Investigator on over 300 experiments performed in space, conducting approximately 100 while in orbit. He is a Fellow of the AIChE, was awarded the McAuliffe Outstanding Teacher Metal, is a recipient of NASA's Space Flight Medal, and is Member of the International Academy of Aeronautics and Astronautics.

Thomas H. St. Onge

Mr. St. Onge's association with the space program began at the Kennedy Space Center in 1980, where he was a payloads engineer, a test conductor, and a payloads processing manager for vertical payloads launched in the Shuttle. In 1985 he joined NASA and transferred to Cleveland's Lewis Research Center (now the Glenn Research Center). His initial assignment supported the development of the ACTS (Advanced Communications Technology Satellite) satellite, an experimental satellite experimenting with new technologies in the Ka Band. In September 1992, Mr. St. Onge joined the Microgravity Science Division at GRC where he managed the Project Management Office. In 1994 he became the Chief of the ISS Facility Projects Branch, responsible for the early concept definitions of a combustion science and fluid physics research facility destined for the Space Station. The ISS Facility Projects Branch activities have since evolved into the full development, integration, and operation of the Fluids and Combustion Facility (FCF), mission integration and planning for GRC investigations destined for ISS, and the operation of the GRC Telescience Support Center (TSC).

Appendix A

Dawn Schaible

Ms. Schaible began her career with NASA at the Kennedy Space Center in 1987, where she served as a Space Shuttle Orbiter Environmental Control and Life Support Systems (ECLSS) Engineer. In this role, she lead the ECLSS, and related payloads interface, ground processing activities for the Orbiter Endeavour. In 1996, Ms. Schaible joined the International Space Station (ISS) Hardware Integration Office, where she served as the Lead Test Engineer for the “Unity” Node and U.S. Laboratory “Destiny” modules. In 2000, Ms. Schaible was selected to serve as Chief, Integration Branch for the ISS/Payload Processing Directorate. In this capacity, she was responsible for managing the integration of the launch site ground processing activities for all Space Shuttle launched payloads and US Space Station Elements. She also served as Chair of the Payloads Utilization Requirements Board, which reviewed and approved all Utilization ground test requirements at the Kennedy Space Center. Ms. Schaible recently completed the Systems Design and Management Program at the Massachusetts Institute of Technology, where she received a M.S. degree in Engineering and Management. Ms. Schaible previously received a B.S. degree in Mechanical Engineering from Bradley University and M.S. degree in Space Systems Operations from the Florida Institute of Technology.

Richard Swalin

Mr. Swalin was involved in NASA’s human space flight endeavors for over thirty years.. During the last fifteen years of his career, he was engaged in those activities associated with utilization of the Space Shuttle. He managed the Space Shuttle’s Customer Service Center where he was responsible for establishing programmatic relationships with potential Shuttle customers. He was also instrumental in bringing about much needed changes to Space Shuttle Payload Accommodations Documentation. The last eleven years of his career were spent in management of the organizations responsible for payload integration. As Manager, Space Shuttle Customer and Flight Integration Office, his responsibilities included assuring customer requirements were appropriately accommodated and implemented in a manner consistent with Program activities and scheduled launch opportunities. In concert with his Program activities, he was responsible for assuring customer satisfaction. Mr. Swalin sponsored numerous initiatives to improve Program accommodation of and responsiveness to customer requests. Mr. Swalin worked closely with payload customer teams throughout NASA, the USA, and the world; and with those engaged in payload integration processes, both analytical and physical. He was also responsible for developing Shuttle manifests that effectively utilized the available resources, both from a programmatic sense as well as flight specific. Mr. Swalin has demonstrated a capability to establish effective customer relationships with a diverse customer base, as well as manage an organization responsible for overseeing requirements accommodation of widely diverse and complex programs. Mr. Swalin has a B.S. in electrical engineering from Southern Methodist University.

Teresa B. Vanhooser

Ms Vanhooser received her Bachelor of Science in Industrial Engineering from Tennessee Tech University and a Masters in Administrative Science Degree from the University of Alabama in Huntsville. She began work at NASA/MSFC in June 1980 in

the Ground Operations Branch of the Systems Analysis and Integration Laboratory. She then moved to the Payload Projects Office in March 1987 where she began as an assistant Mission Manager. She was then assigned as Mission Manager for the ATLAS-2 and the MSL-1 missions that flew successfully in April 1993 and July 1997, respectively. Following the successful flight of the MSL-1 mission she was assigned as the Manager of the Space Station Utilization Office at MSFC, which later became the Multi-use Payload Group. Ms. Vanhooser is now the Manager of the Payload Operations and Integration Department in the Flight Projects Directorate. She is responsible for the development and integration of utilization hardware on the ISS. In addition she is responsible for the ongoing payload operations onboard the ISS.

Rita G. Willcoxon

Rita G. Willcoxon is the Associate Director, Spaceport Technology Projects at NASA's John F. Kennedy Space Center. Her organization is responsible for managing, implementing, directing, and leading activities associated with all development projects at Kennedy Space Center. She oversees staffing, technical architecture, implementation plans, processes, and schedules to meet project requirements for a portfolio of over 150 projects in the areas of Biological Sciences, Shuttle and International Space Station Launch Site support systems, and Advanced Spaceport and Range technology development for future programs. Ms. Willcoxon came to KSC in 1988 in the Payload Operations Directorate. Since that time she has held many positions including Deputy Chief of the Payload Projects Office, Division Chief, Payload Launch Site Support Office, Deputy Chief, Engineering and Science Division of the Spaceport Engineering and Technology Directorate, and Jet Propulsion Laboratory resident office manager. During her payload tenure she and her organizations led teams that planned, processed, and launched Shuttle and Expendable Launch Vehicle payloads including several Spacelab missions, Magellan, European Retrievable Carrier (EURECA), Gamma Ray Observatory, and Cassini. Over the years, Ms. Willcoxon has earned numerous awards. Included in these is the Silver Snoopy award, two Exceptional Achievement Medals, and an Exceptional Service Medal. Ms. Willcoxon graduated from the University of Arkansas in 1982 with a Bachelor of Science Degree in Industrial Engineering. She received her Masters of Science Degree in Industrial Engineering Management from University of Oklahoma in 1986.

Appendix A

THIS PAGE INTENTIONALLY BLANK

STATION AND SHUTTLE UTILIZATION REINVENTION (SSUR) TEAM CHARTER June 6, 2003

Background

The SSUR Team was established as part of a follow-on to the ISS Utilization Management Concept Development Team, chartered to examine detailed options for management of ISS research. The ISS Utilization Management Concept Development Team proposed a “NASA Reinvention” business model. Therefore, NASA management decided to commission a NASA Reinvention team, now named Station and Shuttle Utilization Reinvention team, to be initiated in parallel with solicitation, selection and implementation of an ISS Research Institute. The recommendations of the team should be consistent with the schedule for the planned Phase 1 and optional Phase 2 for the ISS Research Institute. The team leaders of the ISS Research Institute and SSUR will ensure an appropriate flow of information between the teams.

Team Charter

The team will identify and prioritize the areas within ISS and Shuttle end-to-end utilization process most needing change to improve research/user community satisfaction and productivity across all Enterprises. Where appropriate, the team will propose change strategies that will:

- Optimize Agency high priority research throughput,
- Remove impediments to the utilization process,
- Enable ISS Research Institute success,
- Strengthen NASA’s emphasis on the research/user community to enable a world-class research environment in space.

Team Membership

The team is comprised of internal and external subteams. The internal team is comprised of members from NASA Headquarters and Field Centers that are involved in the process. The external subteam is comprised of experts who are knowledgeable about the STS/ISS/Utilization System, know the most serious problems in the system, and will challenge the internal team to solve the big issues. The subteams will work together as one team to accomplish the goals.

Appendix B

Team Products

- Periodic status reports to NASA management
- A set of recommendations and associated forward action plan
- A final report

Team Authority

The SSUR Team will report to the NASA Enterprise Council, which has authority to approve recommended changes. The Enterprise Council has the discretion to forward change issues to the Leadership Council. The Associate Administrators of the Office of Biological and Physical Research and The Office of Space Flight will be the senior advocates for the team providing guidance and resources as required.

Team Duration

The team will begin on January 13, 2003 and plan to complete in August 2003. Additional follow-on work and implementation support may be requested from some or all team members.

Integrated Comments Summary

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
1.	Cycle too long	All	Cycle of proposal to flight is too long (must be less than 3 years)	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
2.	Cycle too long	All	System is user unfriendly time-consuming and difficult	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
3.	Cycle too long	Development	Length, complexity and cost of process discourages users, excessive, redundant, complex documentation	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
4.	Cycle too long	Development	Procedure development is a long, drawn-out process with too many iterations and people involved	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
5.	Cycle too long	Definition/ Development	Hardware development, integration, and training cycle times too long	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
6.	Cycle too long	Definition/ Development	It takes more time, money, and effort to fly an existing flight proven shuttle P/L on ISS as a re-flight P/L, than it costs to fly the same P/L on shuttle.	ISS	POCAAS	PI/PD Commercial, University	2002
7.	Cycle too long	Definition/ Development	Management of Research - Need to shorten cycle times	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
8.	Cycle too long	Development	Integration template is too long	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
9.	Cycle too long	Development	Analytical and physical integration cycle is too long. In some cases, the long cycle drives data products to be due before they are available. The long cycle also drives hardware development budgets higher since integration teams must be staffed earlier	ISS	Freedom to Manage	PIs and PDs	2002
10.	Cycle too long	Definition/ Development	Weakness - costs more to refly same payload	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
11.	Cycle too long	Definition/ Development	Weakness NASA says streamlined process but customer knows he/she is doing three times the work as Spacelab missions	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
12.	Cycle too long	Development	Process seems to require "simple to operate" experiments conform to integration processes that may be appropriate for complex, interactive experiments.. System may not adequately support the needs of these complex research protocols.. Perhaps one size does not fit all	ISS	POCAAS	PI/PD Commercial, University	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
13.	Cycle too long	Development	The simplest changes to plans & procedures require full formal reviews & approval prior to implementation, normally at a cost of not getting the work accomplished until days later if at all	ISS	POCAAS	PI/PD Commercial, University	2002
14.	Cycle too long	Definition/ Development	Go back to the way payloads were handled for Spacelab, Shuttle middeck & SpaceHab. That system worked well... Get a team of experienced Payload developers & ISS program managers to review all current deliverables & complicated approvals with a mandate to cut 70 percent... eliminate endless telecons & practice sessions to required program reviews	ISS	POCAAS	PI/PD Commercial, University	2002
15.	Cycle too long	Definition/ Development	Selection to flight is too long	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
16.	Cycle too long	Definition/ Development	Weakness - ISS imposes more processes - unnecessary to the extreme. Now there is lots of redundancy and overlap. Is a waste of taxpayers dollars	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
17.	Cycle too long	All	Simplify the interfaces; Process too cumbersome. Hard for people to navigate through the maze, too many reviews, too many requirements	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
18.	Cycle too long	All	Short end to end cycle	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
19.	Cycle too long	Definition/ Development	Streamlined process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
20.	Cycle too long	All	Three years from selection to flight to in flight should be the goal	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
21.	Data Archiving / Results	All	Education & Outreach - need to make archives more available, recognizing the intellectual property interest that commercial payloads may have. The archives should web based and their results well cataloged on the web site	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
22.	Data Archiving / Results	Operations	Managing Archival of Research samples, data & results - nothing systematic or consistent across programs. A long term plan is needed.	ISS	On-O	PI's/PD's, NASA, commercial, university, international	2002
23.	Data Archiving / Results	Other	Post flight funding greater than 1 yr is required to analyze data and support publication of research	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
24.	Data Archiving / Results	Operations	Timely reporting or research results by PI following space-flight investigation	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
25.	Data Archiving / Results	Operations	Getting final data and reports from PI's takes too long	Shuttle/ISS	Focus Group	NASA Process Owners & PIs/PDs University & Commercial	Feb-03
26.	Data Archiving / Results	Operations	Excessive length of data archiving time	Shuttle/ISS	Focus Group	NASA Process Owners & PIs/PDs University & Commercial	Feb-03
27.	Data Archiving / Results	Operations	Issue with getting results in a more timely manner after flight	Shuttle/ISS	Focus Group	NASA Process Owners & PIs/PDs University & Commercial	Feb-03
28.	Education & Outreach	Strategic	Advocacy and outreach are "horribly lacking"	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
29.	Education & Outreach	All	Education & Outreach - get PI's closer to media outlet	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
30.	Education & Outreach	All	Education & Outreach - PI's are in the best position for outreach and should spend more time and money on this (possibly by hiring a firm to publicize the results of their research)	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
31.	Education & Outreach	All	Education & Outreach - need to get positive things out of the ISS immediately. There is a public relationship aspect to ISS. Hubble has weekly press releases with pictures. Can an NGO managing ISS do the same?	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
32.	Education & Outreach	All	Education & Outreach - get more "better" materials into the hands of teachers.	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
33.	Education & Outreach	All	Public outreach is horribly lacking	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
34.	Education & Outreach	All	NASA doesn't explain the Station enough	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
35.	Education & Outreach	All	Education & Outreach - No outreach; US public doesn't know about ISS research	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
36.	Education & Outreach	All	Education & Outreach - high priority, need to know how effectively to deal with the media	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
37.	Education & Outreach	All	Education & Outreach - education is done better, but its relevance is not communicated effectively with the public	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
38.	Education & Outreach	Strategic	Establish Code N allocation on research platforms.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
39.	Education & Outreach		Formalize payload announcement, selection, and prioritization processes for Code N payloads.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
40.	Education & Outreach	Strategic	Develop strategy based on Agency principles to ensure that educational activities are consistent with NASA priorities. Multiple entry points for NASA educational activities.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
41.	Education & Outreach	Strategic	Allocation for educational activities is derived via the HEDS enterprise.	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/12/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
42.	Inefficient Integration Process	Development	Interface/safety verification appears excessively costly	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
43.	Inefficient Integration Process	Development	Insufficient flexibility with integration process	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
44.	Inefficient Integration Process	Development	Length, complexity and cost of process discourages users, excessive, redundant, complex documentation	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
45.	Inefficient Integration Process	Development	Limited effective communication opportunities with users during integration process	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
46.	Inefficient Integration Process	Operations	Training of PIMS w/Customer Service Standards	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
47.	Inefficient Integration Process	Definition/ Development	Fix Data Input from Vehicle	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
48.	Inefficient Integration Process	Definition/ Development	Minimize Input Vehicles (re-architect the tools)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
49.	Inefficient Integration Process	Definition/ Development	Expand the PIM Roles and ISS Integration Pock's	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
50.	Inefficient Integration Process	Definition/ Development	Utilize Report Capabilities of tools	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
51.	Inefficient Integration Process	Definition/ Development	Delete Data not required	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
52.	Inefficient Integration Process	Definition/ Development	PIM Primary POC & ISS Integration Pocks	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
53.	Inefficient Integration Process	Definition/ Development	Training Pins on Payload & All Groups on Process	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
54.	Inefficient Integration Process	Definition/ Development	Integrated Process Strengthened	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
55.	Inefficient Integration Process	Definition/ Development	Consolidate Responsibilities w/n IPIC (ISS Integration)	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
56.	Inefficient Integration Process	All	Delete redundant data and data no longer required.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
57.	Inefficient Integration Process	Development	Increasing redundancy of activity - particularly for training and payloads analysis	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
58.	Inefficient Integration Process	Definition/ Development	Managing missions and allocating services - correct functions performed but not executed efficiently	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
59.	Inefficient Integration Process	Definition/ Development	Weakness - When payload makes a change, would like to make one change submittal for all areas impacted by the change. Use one paper. Several products ask the same things	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
60.	Inefficient Integration Process	Development	Weakness - Change Evaluation Form process is difficult, not customer oriented; causes the PD a lot of work resubmitting paperwork unnecessarily	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
61.	Inefficient Integration Process	Development	Weakness - Streamline the ISS payloads process. Not sure if you can do it. Tremendous bureaucracy.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
62.	Inefficient Integration Process	Development	Thankfully, DOD STP took the brunt of Planning & execution, but we still worked with their office to provide inputs. We would seem to go round and round to the point that I was highly skeptical that we would ever fly our Payload	ISS	POCAAS	PI/PD Commercial, University	2002
63.	Inefficient Integration Process	Development	ISS P/L OPS planning and execution practices enforce standards and programmatic requirements to an unnecessary degree	ISS	POCAAS	PI/PD Commercial, University	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
64.	Inefficient Integration Process	Development	ISS P/L OPS planning and execution practices are overly formalized with multiple approval levels.	ISS	POCAAS	PI/PD Commercial, University	2002
65.	Inefficient Integration Process	Development	Analytical Integration of user missions - too many people in the process, need to reduce personnel to essential functions only	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
66.	Inefficient Integration Process	Development	Excessive duplication of activity	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
67.	Inefficient Integration Process	All	Scheduling templates need to be revised with PD involvement and possibly their concurrence	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
68.	Inefficient Integration Process	Operations	Payload developers should be included in an effort to simplify documentation, validate the number of true requirements, minimize the number of interfaces, and the creation of improved scheduling templates.	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
69.	Inefficient Integration Process	Integration	Integration requirements/process not always consistent from flight to flight. Example: Label Development	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/12/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
70.	Inefficient Integration Process	Integration	Number and roles of board meetings are unclear and seem to overlap.	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/12/03
71.	Inefficient Integration Process	Definition	Roles and responsibilities among participating NASA centers are unclear. Example: MSFC vs. JSC	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/12/03
72.	Inefficient Integration Process	Definition/ Development	Experiment Definition/Development required greater flexibility for PI, and increased interactions with engineering and development team	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
73.	Inefficient Integration Process	All	Data simplification algorithms to reduce data and remove proprietary or non-applicable data, central distribution point can reduce impact to mission team.	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
74.	Inefficient Integration Process	Development	ISS has significantly more-stringent hardware design requirements than SSP. Some are logical, some are not. Each is symptomatic of greater issue. Should revisit requirements that exceed SSP standards	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
75.	Inefficient Integration Process	Development	Express does not "expedite". Physical interface is similar to shuttle middeck, but integration products are the same as ISS. Should revisit requirements that exceed SSP standards	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
76.	Inefficient Integration Process	Development	Many current OBPR experiments require access to shuttle middeck and do not require crossing over to ISS. ISS requirements should not be imposed unnecessarily on middeck-only sortie flights. Should revisit requirements that exceed SSP standards	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
77.	Inefficient Integration Process	All	Make changes to reduce utilization costs and schedule requirements without impacting the quality of science return and safety	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
78.	Inefficient Integration Process	Definition/ Development	Establish single location for training and procedure deliverables.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
79.	Inefficient Integration Process	Definition/ Development	Explore incorporating SSBRP generic procedures into core ISS training, Ames to focus on experiment specific training	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
80.	Inefficient Integration Process	All	Integration schedule needs to be revised to be more in synch to hardware development schedules, use PDR and CDR to provide comments on hardware designs.	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/22-25/03
81.	Inefficient Integration Process	All	Provide timely feedback after information is submitted, assign a POC that has the knowledge and access to info to answer questions.	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/22-25/03
82.	Inefficient Integration Process	Definition/ Development	Make a decision and stick with it; Changes in payload configuration and programmatic priorities drive up costs.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/22-25/03
83.	Inefficient Integration Process	All	Integration Processes must be optimized to support commercialization	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
84.	Inefficient Integration Process	All	Margins must be optimized to support commercialization late adds	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
85.	Inefficient Integration Process	All	Continue to optimize PL or Program Integration processes	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
86.	Inefficient Integration Process	Operations	Conduct manifesting only after firm allocations provided to utilization	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
87.	Inefficient Integration Process	All	Reduce/eliminate planning to multiple scenarios or latest rumors	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
88.	Inefficient Integration Process	All	Reduce number of boards and cycle time required for approval of Clefs	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
89.	Inefficient Integration Process	All	Payload Developers should not be required to submit or resubmit CEFS because ISS program cannot accommodate previously submitted requirements	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
90.	Inefficient Integration Process	All	Eliminate launch package assessment	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
91.	Inefficient Integration Process	All	Reduce CoFR paperwork to Table E-1	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
92.	Inefficient Integration Process	All	Single endorsement statement from each payload	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
93.	Inefficient Integration Process	All	Eliminate Table E-2 and Open Work Tracking Log	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
94.	Inefficient Integration Process	All	Establish whether CoFR endorsements are submitted through the discipline, NASA Center, or Facility	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
95.	Inefficient Integration Process	All	Continual re-evaluation of the processes	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
96.	Inefficient Integration Process	All	Information should exist in a single accessible database.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
97.	Inefficient Integration Process – Crew Access	All	Face saving/PR orientation in solving problems in-flight. Requests for crew activities to gather information relevant to potential in-flight anomalies are discouraged. Perception consequences are given too much weight (e.g. "it would look bad")	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
98.	Inefficient Integration Process- Crew Procedures	Development	Mission Operations Integration - Training inefficient, ineffective: crew doesn't interact with team	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
99.	Inefficient Integration Process- Crew Procedures	Development	Mission Operations Integration - needs computer based training - need to invest in tools, standards to do this	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
100.	Inefficient Integration Process- Crew Procedures	Development	Weakness - determine the efforts put into crew training versus the accomplishments. Crew training - they follow only the written procedures by an astronaut candidate.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
101.	Inefficient Integration Process- Crew Procedures	Development	Weakness - Crew training and procedures used to work; had access to people who knew what they were doing; now its complicated and too process oriented.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
102.	Inefficient Integration Process- Crew Procedures	Development	Weakness - Procedures are a nightmare. No one understands final procedures. Takes longer to read the procedure than to do it. Procedures need to be totally evaluated. Insisting that procedures be on computer has created a mess. Crew needs cue cards	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
103.	Inefficient Integration Process- Crew Procedures	Definition/ Development	Duration of training lag times necessitates refresher training materials for crew: PI interaction with crew needs to be increased.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
104.	Inefficient Integration Process- Crew Procedures	Definition/ Development	Allow Ames to self-manage all phases of crew training	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
105.	Inefficient Integration Process- Crew Procedures	All	Assign crews earlier, refresher disks made available to the crew, no dry runs after flying one or two times	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
106.	Inefficient Integration Process- Crew Procedures	All	Train crew on facilities that are already on orbit in the 18 months timeframe, then within 6 months try to train on specific experiments.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
107.	Inefficient Integration Process- Crew Procedures	All	Science office more than just a crew. Time to devote to science before flight.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
108.	Inefficient Integration Process- Crew Procedures	All	Hardware crew can practice on or model. Best HW and SW simulators on site.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
109.	Inefficient Integration Process- Crew Procedures	Operations	More use of on-orbit training	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
110.	Inefficient Integration Process- Crew Procedures	Operations	6 month training should be standard	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
111.	Inefficient Integration Process- Crew Procedures	Operations	Stress importance to crew of the R+0 to R+4 hour timeframe for HLS investigations.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
112.	Inefficient Integration Process- PDL	Development	Weakness - PDL not easy to navigate	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
113.	Inefficient Integration Process- PDL	Development	The ISS P/L Data Library (PDL) requires excessive researcher effort to maintain & the NASA P/L OPS personnel do not always use it.	ISS	POCAAS	PI/PD Commercial, University	2002
114.	Inefficient Integration Process- PDL	Development	Analytical Integration of user missions -the payload data library is currently not utilized, though there are a lot of requests for the same data; there should be single points of entry for data submission and retrieval of information to the PDL.	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
115.	Inefficient Integration Process- PDL	Development	Weakness - PDL useless, eats up personnel time to implement, too many changes/upgrades, and can't access after changes/upgrades, people who need it don't use it. PDL needs simplified not changed/upgraded constantly as has been over past 5 years. Scrap PDL its not working. PD faithfully provides PDL input, then get phone calls from people who have not checked PDL for inputs. People call PD anyway.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
116.	Inefficient Integration Process- PDL	Operations	Need data library function that can be maintained on the PD's machine with inputs/updates being periodically uploaded to the PDL or database system when necessary	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
117.	Inefficient Integration Process- PDL	All	PDL must be better implemented (too many databases)	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
118.	Lack of customer involvement in process	All	Lack of customer involvement in decisions affecting them	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
119.	Lack of customer involvement in process	All	Develop Clear Integrated Process & Communicate It; PD given more authority and responsibility for getting through the ISS integration process. No longer shielded from many of the interfaces currently required with ISS and SSP integration process.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
120.	Lack of customer involvement in process	Development	Mission Operations Integration - Too many steps between PI and crew; PI's should go to KSC to train directly with crew	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
121.	Lack of customer involvement in process	Definition/ Development	Establishing payload/experiment requirements and feasibility - scientist should drive requirements and be better integrated together with other requirements	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
122.	Lack of customer involvement in process	Definition/ Development	Managing missions and allocating services - researcher not treated as customer but as a passenger	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
123.	Lack of customer involvement in process	Operations	Conducting research & analysis and disseminating results - the system is not very friendly to the PI	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
124.	Lack of customer involvement in process	Development	PI/PD teams feel as if they have little formal input to the process. They are not made aware of the reasons for the reasons driving the previous issues. They are not sufficiently aware of status of their payloads in the analytical and physical integration process. The mechanism for gathering, analyzing and implementing changes due to feedback from PI/PD teams requires improvement.	ISS	Freedom to Manage	PIs and PDs	2002
125.	Lack of customer involvement in process	All	Principal investigators feel left out of the process	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
126.	Lack of customer involvement in process	Development	Mission operations integration - PI's need to be involved in training	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
127.	Lack of customer involvement in process	Operations	Weakness - communication is an issue. There are 5 levels between PI/PD and the crew.. Not functional. We can't talk directly to the crew during the mission. This is especially hard when the crew asks questions of us; it's like a game of telephone tag. How it comes down doesn't represent reality.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
128.	Lack of customer involvement in process	All	Improve customer focus and acceptance of changes	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
129.	Lack of customer involvement in process	All	Have PI's talk to engineers about the significance of the science and vice versa	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
130.	Lack of Flight Opportunities	Strategic	Experiments are selected but are not manifested or cannot meet the target manifest	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
131.	Lack of Flight Opportunities	Strategic	Lack of Flight Opportunities. Payload customers already in the queue have a backlog resulting in unanticipated costs to the customers, science/technology to become dated and uncertainty to ripple through the subsequent payload selections. Payload customers are given an unrealistic expectation for manifesting	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002
132.	Lack of Flight Opportunities	Strategic	Selecting and prioritizing research-Manifesting not well realized	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
133.	Lack of Flight Opportunities	Definition	Lack of Payload priority. Science payloads, even when manifested, have been bumped by ISS assembly and logistics requirements	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002
134.	Lack of Flight Opportunities	All	More timely and reliable access to the ISS when the Shuttle flight rate increases to five flights per year	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
135.	Lack of Flight Opportunities		Development and production of the first EXPRESS Pallet	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
136.	Lack of Flight Opportunities	Strategic	Ensure research capability of ISS/Shuttle is sufficient for highest priority payloads.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
137.	Lack of Flight Opportunities	Strategic	Adequate definition of available flight resources and allocations for planning 2-4 years in the future	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
138.	Lack of Flight Opportunities	Strategic	One non-ISS Shuttle flight per year to fly off the backlog of University Research from all Codes, GAS, and non traditional.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
139.	Lack of Flight Opportunities	All	Get more experiments on board. Short the time so more valuable science on station	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
140.	Lack of Flight Opportunities	All	Reserve payloads on board if time permits	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
141.	Lack of Flight Opportunities	All	Maximize opportunities for payloads during ISS assembly	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
142.	Lack of Flight Opportunities	Operations	Firm Resource Allocation to utilization NLT L-16 months	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
143.	Lack of Flight Opportunities	All	Better to have a few happy PI's than a lot of unhappy	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
144.	Lack of NASA priority System	Strategic	Differing priorities are placed on different payload types	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
145.	Lack of NASA priority System	Development	NASA does not have an integrated manifesting approach to optimize NASA resource utilizations	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
146.	Lack of NASA Priority System	Strategic	Lack of commitment to ISS as a world-class International research facility. Poor alignment of research prioritization with Agency needs and with possibilities for significant successes	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001/2002
147.	Lack of NASA Priority System	Development	Lack of commitment to ISS as a world-class International research facility. Manifesting/flight planning "seemingly arbitrary" and not controlled by research advocates	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001/2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
148.	Lack of NASA Priority System	Definition	Lack of Payload priority. Science payloads, even when manifested, have been bumped by ISS assembly and logistics requirements	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002
149.	Lack of NASA priority System	Strategic	Changing programs and focus	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
150.	Lack of NASA priority System	Strategic	Selecting and prioritizing research - No consolidated/integrated Agency plan that is consistent with NRC research; national prioritization is lacking	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
151.	Lack of NASA Priority System	Strategic	Managing missions and allocating services - one organization must have the big picture in order to optimize all research on ISS	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
152.	Lack of NASA Priority System	Definition	Multiple organizations brokering "commercial" activities should be a hot topic for the SSUR	ISS	Focus Group	Code U	3/12/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
153.	Lack of NASA Priority System	All	Lack of a strong vision and decision making (back and forth decisions/non decisions) results in inefficient operations and utilization/waste of resources. Example the WONDER payload was manifest on the SSP then ISS then ISS/SSP then ISS Sortie	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
154.	Lack of NASA priority System	All	No integrated priorities across the agency	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
155.	Lack of NASA priority System	All	Priority of International experiments on US hardware, International can reprioritize their experiments after overall US science scoring	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
156.	Lack of NASA priority System	All	Lack of a prioritization system at Agency	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
157.	Lack of NASA Priority System	All	No formal request for flight for Code M payloads (DoD, Commercial, Education)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
158.	Lack of NASA Priority System	All	Assets required for manifesting are fragmented across agency. (Carrier programs are split between KSC and JSC). Customer has witnessed conflict between the two programs.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
159.	Lack of NASA Priority System	All	Non-NASA funded PI's have to shop around to get sponsoring code to get manifested (Education & Commercial)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
160.	Launch Site Operations	Development	Weakness - Need better computer support at KSC. KSC/IT contractor provided no support	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
161.	Launch Site Operations	Development	Weakness - Need to improve scheduling of security escort	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
162.	Launch Site Operations	Development	Weakness - Secondary payload customers do not have top billing for scheduling at KSC. KSC is not looking at secondary payload customer schedule input.	Shuttle	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
163.	Launch Site Operations	Development	Weakness - Need to improve the receiving process at KSC. It's hard to get items through Quality. Establish process to involve customer in identifying pre-ship conditions so as not to hold up the receiving process	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
164.	Launch Site Operations	Development	Weakness - too much boilerplate in KSC meetings. Spend less time on fluff in meetings instead of what really matters	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
165.	Launch Site Operations	Development	Weakness - Off-line briefings at KSC have too many people involved, need to keep it small.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
166.	Launch Site Operations	Development	Weakness - Biggest concern is shipping hardware out of KSC. Process changed about 3 times during mission. Need to document and educate customer on current process	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
167.	Launch Site Operations	Development	Weakness - KSC should provide consistent inspection criteria. Had 3 different sharp edge inspections. Passed first and second and failed final. Explain process to customer	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
168.	Launch Site Operations	Development	Weakness - KSC documentation process is too lengthy - but much faster than other organizations	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
169.	Launch Site Operations	Development	Weakness - KSC needs to be involved earlier in the payload development phase to coordinate test & support requirements. Biggest problem getting both parties to agree. On some occasions KSC did not agree requirements were valid. Required more time to explain the requirements (difference between European standard vs. KSC standard)	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
170.	Launch Site Operations	Development	Weakness- More restrictive processes at KSC not conducive to factory type work (number of personnel supporting same level of support regardless of hazard or risk level)	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
171.	Launch Site Operations	Development	Weakness - Operations at KSC are very crane intensive. Too many people on the floor during lifting. KSC process is overburdened could be more efficient. Have smaller teams for low risk operations	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2001
172.	Launch Site Operations	Development	Weakness - customer drops off the face of the earth after launch; no interface to test team and management post mission. Could use some help getting stuff moved back home from KSC	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
173.	Launch Site Operations	Development	Weakness - requirements of pad at KSC were interpreted several different ways depending on whom you spoke with.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
174.	Launch Site Operations	Development	Weakness - Contractor and KSC personnel hard to tell who did what. Pad operations were a disaster. Was sent in circles. Contractors have no teamwork.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
175.	Launch Site Operations	Development	Weakness - KSC Shipping/Receiving of general goods required a significant level of direct involvement. Suggest a single point of contract independent of flight/nonflight, written process, point of contact along this process, flowchart of process	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
176.	Launch Site Operations	Development	Weakness - Lack of IT contractor support at KSC, which resulted in customer reliance on Hangar L computer support.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
177.	Launch Site Operations	Development	Weakness - First shift worked very well at KSC, and got things done, while second shift did not accomplish much, frustrating.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
178.	Launch Site Operations	Development	Weakness - KSC Scheduling at Pad and OPF proved to be a problem; schedule would indicate one time, but operations started several hours later. Several situations quoted during HST flow	Shuttle	KSC Customer Survey 2001, 2002	NASA Center	2002
179.	Launch Site Operations	Operations	Weakness - customer wants experiment back quickly after return. Need lab facilities and equipment available at KSC to do research ASAP.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
180.	Launch Site Operations	Development	Weakness - Saw adversarial relationships between contractors at KSC.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
181.	Launch Site Operations	Development	Weakness - KSC has a mentality of if you have a question, have a meeting. Minimize these meetings.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
182.	Launch Site Operations	Development	Weakness - KSC needs earlier identification of policy and procedure requirements; still working some issues after hardware arrival	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
183.	Launch Site Operations	Operations	Hand off of from future payload manager to Mission Manager at KSC on both Shuttle & Station Payloads	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
184.	Manifesting	Development	Lack of commitment to ISS as a world-class International research facility. Manifesting/flight planning "seemingly arbitrary" and not controlled by research advocates	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
185.	Manifesting	Development	Multiple flight justification and approval cycles	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
186.	Manifesting	Development	Different Manifesting Processes for ISS and SSP. Multiple manifesting paths for ISS and SSP are causing confusion in customer community	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
187.	Manifesting	All	Time between selection and flight needs to be reduced	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
188.	Manifesting	All	Expedited process for follow-up ISS experiments is required.	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
189.	Manifesting	Definition/ Development	Streamlined or "fast track" approval process for OCR disposition is required for life science or specimen health related issues	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
190.	Manifesting	All	Resource allocation/control has evolved to the highest level - far away from requirements generation. Payload requirements are currently collected and integrated to see what is manifest able - management of larger and larger experiments cadres is not efficient (or perhaps effective). Each payload has a unique set of mission resource requirements that may be dynamic (voluntarily or imposed)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
191.	Manifesting	Definition/ Development	Manifest for flight immediately after start of Phase B	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
192.	Manifesting	All	Utilize SSP middeck process as much as possible.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
193.	Manifesting	Definition/ Development	Standardization and documentation of Shuttle and ISS manifesting process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
194.	Manifesting	Strategic	Dedicate SSP resources for investigations that only require short duration flights.	Shuttle	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
195.	Manifesting	All	Update ISS Assembly Sequence More Frequently	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
196.	Manifesting	All	Organizations need to plan to same flight dates	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
197.	Manifesting	Operations	Maintain high standards before awarding flight slot	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
198.	Manifesting	All	No formal request for flight for ISS based Code M payloads (DoD, Commercial, Education)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
199.	Manifesting	Strategic	Non-NASA funded PI's have to shop around to get sponsoring code to get manifested (Education & Commercial)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
200.	Manifesting	Strategic	For SORTIE payloads have to go through two processes (1628 and station manifesting process)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
201.	Manifesting	All	Possible redundant boards in area of Shuttle and Station Manifesting (Flight Planning "Board, Space Station Utilization Board,)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
202.	Manifesting	Strategic	DSO & DTO experiments don't have to go through same process as other payloads for manifesting	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
203.	Manifesting	Strategic	Multiple ways to get flight assignments (like 1618 for shuttle)	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
204.	Manifesting	Strategic	Lack of a prioritization system at Agency	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
205.	NASA Risk Philosophy	All	Responsibility for payload success is unclear	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
206.	NASA Risk Philosophy	Definition/ Development	NASA has become stricter on the reliability requirements for experiment hardware so that it is now a major cost driver. The emphasis on designing failure-proof hardware causes the devices to be built beyond a level of robustness that is needed to collect the scientific data.	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
207.	NASA Risk Philosophy	Definition/ Development	Develop cost, schedule and risk assessments - need to recognize that there is more than one type of risk, safety risk to vehicle & crew, business risk, risk to research. PI should own business risk and risk to research	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
208.	NASA Risk Philosophy	Definition/ Development	Develop cost, schedule and risk assessments - PI's should decide whether they want to MILSPEC equipment	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
209.	NASA Risk Philosophy	Definition/ Development	Developing and qualifying flight research systems - accept higher risk to mission success (not safety) in exchange for lower cost. This is allowed by re-flight capability	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
210.	NASA Risk Philosophy	Definition/ Development	Accelerate processes by address adversity to risk: all things do not need to operate at a level of 100% reliability; there is incentive to do things 3 or 4 times and this hinders accelerating process	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
211.	NASA Risk Philosophy	Definition/ Development	Developing and Qualifying flight research systems - need to redefine "success" to obviate the "fear of failure"	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
212.	NASA Risk Philosophy	Definition/ Development	Weakness - should look at safety and interface issues only. Give scientist ability to fail. Scientist should take responsibility and should do it his way; doesn't need standards imposed. If crew can't follow refresher material, let PI/PD fail.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
213.	NASA Risk Philosophy	All	Need to differentiate between safety requirements and mission assurance requirements	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
214.	NASA Risk Philosophy	All	Give user science success on a trial basis	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
215.	NASA Risk Philosophy	Definition/ Development	Ames is experienced at developing successful payloads. Let Ames manage and control risk. Delegate authority to Ames to self-certify its payloads.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
216.	NASA Risk Philosophy	All	Integrated system between all parties is required to manage risk	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
217.	NASA Risk Philosophy		Cost to develop payload is less in commercial – NASA not willing to take as much risk due to accountability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
218.	NASA Risk Philosophy		Too many requirements, assumptions, too conservative, that drive up cost to customer	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
219.	NASA Risk Philosophy		Documentation for CSC payload less than NASA Payload	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
220.	NASA Risk Philosophy		Process not flexible to accommodate small to large payloads	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
221.	NGO	Strategic	Lack of commitment to ISS as a world-class International research facility. Insufficient science leadership and accountability to users regarding decisions, priorities, and processes	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
222.	NGO	Strategic	Lack of commitment to ISS as a world-class International research facility. Poor alignment of research prioritization with Agency needs and with possibilities for significant successes	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
223.	NGO	Development	Lack of commitment to ISS as a world-class International research facility. Manifesting/flight planning "seemingly arbitrary" and not controlled by research advocates	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
224.	NGO	Strategic	Management of Research - Need for the NGO to be an advocate for the user	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
225.	NGO	Development	Managing missions and allocating services - user concerns must be considered, not just vehicle concerns. Need an NGO which understands user concerns and is accountable to the user community to interface with the vehicle	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
226.	NGO	Strategic	HQ should make research selections with NGO supporting.	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
227.	NGO	Other	NGO should help facilitate commercial barter (donation of hardware or facilities for an offset	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
228.	NGO	Other	NGO needs to attempt to offset the desire of PI's to have new hardware built for their research. The NGO should consider modifying existing hardware to meet the research's needs or otherwise getting less research.	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
229.	NGO	All	Preparing and allocating budgets - decided that NGO must prepare the budget request	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
230.	NGO	Other	Code M RPO not currently part of Institute	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
231.	On-Orbit Operations	Operations	Inability to make adjustments and/or experiment modifications during flight	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
232.	On-Orbit Operations	Operations	Lost opportunities for multiple experiments in a single mission/increment	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
233.	On-Orbit Operations	Operations	Weakness - communication is an issue. There are 5 levels between PI/PD and the crew .. Not functional. We can't talk directly to the crew during the mission. This is especially hard when the crew asks questions of us; its like a game of telephone tag. How is comes down doesn't represent reality.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
234.	On-Orbit Operations	Operations	Real-time ops - major problem is inability of program/cadre to understand and accept that most payloads are not on console 24-7 & not physically located within HOSC... NASA has supported idea of telescience but has not the practical implementation of it.. no reliable mechanism for payloads to stay informed of events & decisions that occur while they are off console.. applications & tools are not accessible to everyone... simple things like crew procedures & OCR's aren't accessible unless sitting on console	ISS	POCAAS	PI/PD Commercial, University	2002
235.	On-Orbit Operations	Operations	Weakness - the politics of using just Russian or just American astronauts is silly. There should be one common path for experiments. Current approach doubles length of time to do experiments. Not really 3 crew members available, really on 1.5 since have to use Russian or American.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
236.	On-Orbit Operations	Operations	Find complement of automated versus crew operated experiments	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
237.	On-Orbit Operations	Operations	Crew training needs higher priority that involves sufficient time with crewmember who actually performs the experiment.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/11-14/03
238.	On-Orbit Operations	Operations	Crew training would benefit from a collaborative re-examination by all affected parties.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/11-14/03
239.	On-Orbit Operations	Operations	Science team, not POIC, should prioritize scheduling of individual experiment activities within allocated crew time	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/24-27/03
240.	On-Orbit Operations	Operations	Additional wish list of science related activities should be maintained in event of extra crew availability or mission extension	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/24-27/03
241.	On-Orbit Operations	Operations	Adequate staffing and training of mission support personnel to prevent fatigue, staffing requirements underestimated in critical areas such as command and control	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/24-27/03
242.	On-Orbit Operations	Operations	Operations plan detailing how the team will operate during the mission should be created, and all team members trained on it, prior to the first simulation	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/24-27/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
243.	On-Orbit Operations	Operations	Continuous, open communication between all organizations is required to ensure mission success	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
244.	On-Orbit Operations	Operations	Crew need to know science and be familiar with research	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
245.	On-Orbit Operations	Operations	Need to facilitate communication between crew and PI	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
246.	Organizational Issues	Definition/ Development	Nonuniformity between field centers on standards/requirement levied on customers	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
247.	Organizational Issues	Strategic	No coordination across codes and Program	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
248.	Organizational Issues	Development	Circumvention of established integration process	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
249.	Organizational Issues	Definition	In some cases, the NASA technical support to PDR's and CDR's has deteriorated to the point where the value added is questionable	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
250.	Organizational Issues	Development	The missions with multiple mission management organizations, multiple IPT's, and multiple control boards cause necessary work and consume additional resources	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
251.	Organizational Issues	Development	Lack of standardization, nonresponsiveness to user inputs	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
252.	Organizational Issues	Definition/ Development	"Too many people" with multiple points of contact, interfaces, and handoffs	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
253.	Organizational Issues	Definition/ Development	Too many layers of management, overlapping and poorly defined lines of authority and responsibilities	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
254.	Organizational Issues	Definition/ Development	Lack of communication between organizations	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
255.	Organizational Issues	Development	Different Manifesting Processes for ISS and SSP. Multiple manifesting paths for ISS and SSP are causing confusion in customer community	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
256.	Organizational Issues	Development	Why do MOD, SpaceHab, and ISS all have different requirements, guidelines, and formats for developing crew procedures? NASA should develop a standardized set of requirements & formats to follow so that crew procedures developed, and validate an experiment could be used on any vehicle.	ISS	POCAAS	PI/PD Commercial, University	2002
257.	Organizational Issues	Strategic	Management of Research - Someone needs to be "in charge" of all research - science, technology and commercial	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
258.	Organizational Issues	Strategic	Managing missions and allocating services - one organization must have the big picture in order to optimize all research on ISS	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
259.	Organizational Issues	All	NASA center negotiations should be eliminated.	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
260.	Organizational Issues	Definition/ Development	Management of Research - Need to know who is in charge (have one focal point)	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
261.	Organizational Issues	Definition/ Development	Management of Research - Need to eliminate layers	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
262.	Organizational Issues	Definition	Establishing payload/experiment requirements and feasibility - need a single point of entrance for users	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
263.	Organizational Issues	All	Lines of responsibilities for the functions become too dispersed and are subject to multiple interpretations	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
264.	Organizational Issues	Development	Payload processing requirements and safety are well substantiated but are encumbered by too much overhead (both too many people and too many organizations)	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
265.	Organizational Issues	Definition/ Development	Mission management is well understood though with low efficiency	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
266.	Organizational Issues	Development	Excessive duplication of activity	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
267.	Organizational Issues	Development	Analytical Integration - needs to be streamlined; a single responsibility is needed	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
268.	Organizational Issues	Definition/ Development	PI/PD must interface with overlapping groups, with complex processes. Different organizations often ask for similar data. This drives confusion in the payload community	ISS	Freedom to Manage	PIs and PDs	2002
269.	Organizational Issues	All	Weakness - know NASA knowledge is there (from shuttle and Spacelab days) but people with knowledge don't interface with the customer. People not applied in right places	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
270.	Organizational Issues	All	Weakness - when someone moves on, there is not necessarily someone else there with the same knowledge and experience. Puts PI into learning process	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
271.	Organizational Issues	All	Weakness - worst system worked with in long govt career. Complicated and convoluted, constantly tell customer we can't help and refer to someone else, get lost in the system, too many levels; nobody has authority to help, they want to help but cant	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
272.	Organizational Issues	All	Weakness - with the number of people and organizations involved, communications breaks down. Have to report/give same status to too many different people. Should report to one person and no worry if other organizations know. MSFC and JSC folks should talk more. If have problems on orbit, overwhelmed with status reports-giving same information to many different people.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
273.	Organizational Issues	Development	Weakness - there's a problem between MSFC and JSC as to who implements process.. Is very confusing.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
274.	Organizational Issues	Definition/ Development	Number of POC's and databases is overwhelming to stay current & keep updated... have to have a detailed understanding of MSFC processes & systems... used to have an integration engineer for ops to serve as a single POC to assist with overall process	ISS	POCAAS	PI/PD Commercial, University	2002
275.	Organizational Issues	Definition/ Development	I have been developing & successfully flying experiments since 1974 and have never seen it his bad nor as confusing as it is with Payload ops planning & mass confusion with the MSFC as the middleman	ISS	POCAAS	PI/PD Commercial, University	2002
276.	Organizational Issues	Development	Weakness - Need better understanding of roles and responsibilities between KSC NASA Mission Manager and Contractor Payload Mgr; confusion in communication--who do I give arrival dates to?	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
277.	Organizational Issues	Definition/ Development	Weakness - Too many people wanting the same information but filled out differently. Way the information is delivered changes depending on who's in charge.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
278.	Organizational Issues	Definition/ Development	Weakness - ISS and Shuttle do not communicate clearly. Templates, systems, and papers are different. Examples are ISS manifest=CEF, Shuttle =1628. Development template longer on ISS	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
279.	Organizational Issues	All	Weakness - NASA authority spread across too many centers.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
280.	Organizational Issues	Definition/ Development	Major factor regarding burden is that NASA does not have a coordinator and there are a hundred people asking for info..... Have a project coordinator for each projects.	ISS	POCAAS	PI/PD Commercial, University	2002
281.	Organizational Issues	Definition/ Development	Weakness - problem between way NASA does business & external customers do business	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
282.	Organizational Issues	Definition/ Development	International Partners want a single Government interface (concerns about NGO)	ISS	Focus Group	Code I	3/12/03
283.	Organizational Issues	Definition/ Development	No good way to improve speed of signing agreements	ISS/ Shuttle Primarily ISS	Focus Group	Code I	3/12/03
284.	Organizational Issues	Definition/ Development	Complicated interfaces across organizations	ISS	Focus Group	Code Y	3/12/03
285.	Organizational Issues	Definition/ Development	System is too complex	ISS/ Shuttle Primarily ISS	Focus Group	Code Y	3/12/03
286.	Organizational Issues	Definition/ Development	Work is too distributed	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/12/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
287.	Organizational Issues	Definition/ Development	Process is too cumbersome for the customer and the NASA people in the system	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/12/03
288.	Organizational Issues	Strategic	Multiple entry points for NASA educational activities.	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/12/03
289.	Organizational Issues	All	Paucity of "science-types" in KSC NASA management hierarchy. If science is the driver for the ISS , why are not the scientists making high (within KSC) level management decisions for those projects managed out of KSC.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/25/03
290.	Organizational Issues	All	Musical chairs management organizational structure. NASA appears to favor rotating its people in and out of different positions/directorates. While this has merit in terms of exposing them to diverse experiences, it can be detrimental to the projects they manage.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/25/03
291.	Organizational Issues	All	Chief scientists should be at each center	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	6/16-19/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
292.	Organizational Issues	Operations	People at MSFC & JSC protect crew time while crew say they don't have enough to do	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
293.	Organizational Issues	All	Assets required for manifesting are fragmented across agency. (Carrier programs are split between KSC and JSC). Customer has witnessed conflict between the two programs.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
294.	Organizational One NASA	All	Different Programs use different names for same document	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	
295.	Organizational One NASA	All	Reduce number of interfaces to PI, PED Project Manager and Project Scientist primary interface to PI	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
296.	Organizational One NASA	Definition/ Development	SCR/RDR Process needs to be consistently applied across centers between disciplines. Some RDR requirements are better suited as PDR requirements	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
297.	Organizational One NASA	Definition/ Development	Single Integrated Data	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
298.	Organizational One NASA	Definition/ Development	Single Entry Location at Different Levels of Maturity	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
299.	Organizational One NASA	Definition/ Development	Streamline Processes to Eliminate Duplication of Resp.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
300.	Organizational One NASA	Definition/ Development	Implement Tool Connectivity	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
301.	Organizational One NASA	Definition/ Development	Consolidate tools or Integrate to Communicate w/ each Other	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
302.	Organizational One NASA	Definition/ Development	ISS Integration assist PD's w/Data Entry (Flexibility Needed)	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
303.	Organizational One NASA	Definition/ Development	PD creates single set of docs & ISS Integration Disseminates	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
304.	Organizational One NASA	Definition/ Development	PD/PIM POC List roles & resp. (Consolidate/Simplify)	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
305.	Organizational One NASA	Definition/ Development	Streamline and clearly define, document, and communicate the process	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
306.	Organizational One NASA	All	Educate all participants on the process	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03
307.	Organizational One NASA	All	Provide standard program interface to PD that shields them from many of necessary but cumbersome processes.	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	2/24-27/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
308.	Organizational One NASA	Definition/ Development	Compared with Shuttle/Mir computer software design process and training approval process differing standards at JSC & MSFC, competing committee structures, changing requirements are more cumbersome & frustrating	ISS	POCAAS	PI/PD Commercial, University	2002
309.	Organizational One NASA	All	Problems with interfaces between offices & centers	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
310.	Organizational One NASA	Definition/ Development	Developing and Qualifying flight research systems - inconsistency between Station, Shuttle & Centers	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
311.	Organizational One NASA	Definition/ Development	PD is required to enter identical information in multiple places or via email per the request of different groups.... There should be one place to enter data.. Different groups request data in different formats.. We spend a lot of time inputting data in different places, but it does not seem that the majority of this data is even used by the program	ISS	POCAAS	PI/PD Commercial, University	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
312.	Organizational One NASA	Definition/ Development	Establishing payload/experiment requirements and feasibility - need a common set of standards; the way of operating is different at each center (i.e.: some centers build payloads in house while other contract out	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
313.	Organizational One NASA	All	Consolidate all Agency level process-improvement teams under a single charter and management scheme	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
314.	Organizational One NASA	All	Uniform standards, process across centers	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
315.	Organizational One NASA	Definition/ Development	ISS program did not initially incorporate integration lessons learned from Shuttle but are working with customers to improve. Example: Template for EPO reduced to L-12M	ISS/ Shuttle Primarily ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/12/03
316.	Organizational One NASA	Definition/ Development	Need uniform and standards (engineering standards, design philosophy) process across Centers	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/13/03
317.	Organizational One NASA	All	Create inter-center process to establish verification categorization unique to each payload and mission	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
318.	Organizational One NASA	All	Identify key relationships/decision process between NASA Codes, the ISS Brand Management function, the Institute, and the Human space flight programs (ISS and SSP) SPD and RPCs	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
319.	Organizational One NASA	All	NASA is the expert and needs to help the University customer find the best platform. They are forced to find NASA without published org charts and web help	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	4/8-11/03
320.	Organizational One NASA	All	ISSP/Center/HQ Organization structure should be program/project oriented and consistent with ISS era	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	5/20-23/03
321.	Organizational One NASA	Strategic	Every Center can write Space Act Agreements (Flight Opportunities) with no mechanism to make agreements. Makes false promises to customers	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	Feb-03
322.	Organizational One NASA	Strategic	One NASA, animal care and use	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	Feb-03
323.	Organizational One NASA	Strategic	Too many entry points	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	Feb-03
324.	Organizational One NASA	All	Too many interfaces/lack of coordination between centers	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	Feb-03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
325.	Other	All	Process is too expensive	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
326.	Other	All	Relationship with customers is confrontational	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
327.	Other	Definition/ Development	NASA is developing payloads, facilities, and carriers in parallel	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
328.	Other	Development	PI's are not prepared for the level of effort needed to define and develop experiments to be performed in space	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
329.	Other	Development	The bonded storage system has become very inefficient and an impact on hardware development, processing and troubleshooting schedules all of which increases risks	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
330.	Other	Definition/ Development	Investigator working groups (IWGs) are costly in terms of PI team travel and time and quite often there is little benefit for the PIs	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
331.	Other	All	Get immediate as well as periodic feedback to continually look for ways to get better	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
332.	Other	Strategic	Inadequate use of available hardware for multiple experiments	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
333.	Other	All	Advisory groups have fed recommendations back to the program office but have not been implemented	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
334.	Other	All	Consider incentives/disincentives for improvements (not just change)	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
335.	Other	Strategic	Defining & implementing policy & strategic plans - Some functions are wholly abandoned, though with still some localized success.	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
336.	Other	Strategic	Defining & implementing policy & strategic plans - implementation of and strategic planning does not work well	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
337.	Other	Definition	Develop cost, schedule and risk assessments - need to standardize equipment	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
338.	Other	Development	Ground systems neglected at every level	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
339.	Other	Strategic	Weakness - ISS is not building new payloads - just doing reflights (repeat science). What are we proving- it's the same science. The operations concept is where ISS fell down. Should look at payload that has never been done before.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
340.	Other	Operations	Weakness - Payload environment at HOSC more concerned with astronauts time than making science successful	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
341.	Other	Development	Weakness - When team first arrived, we were treated like second class citizens. Since we were the contractor, we were not provided the typical "customer treatment". Had we been any other company, we would have been treated with first class facilities.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
342.	Other	All	Weakness - The contracts in place perpetuate problems since problems get paid. Contractors are looking for time and material contracts - not buying into science.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
343.	Other	All	Weakness - surveys have been done before, nothing changed or will change. NASA does cherry picking; they agree to fix things they want to fix and leave others behind. Nothing is going to change with this feedback effort.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
344.	Other	Strategic	Weakness- ISS is building hardware - not doing science. Need more astronaut time for science. Science needs more serious consideration. An example is a 3 day turnaround doesn't work for biological tissue--all are dead then.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
345.	Other	Definition/ Development	ISS Payloads office needs to be more responsive and more customer oriented. Office needs to respond more to customer & less to vehicle.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
346.	Other	Definition/ Development	Developing and qualifying flight research systems - develop user's guide for ISS payload developers	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
347.	Other	Definition	No clearing house exists for all hardware available. No method on how to share and reserve existing hardware. Previous studies have been critical for duplication of H/W development. This may be a manifesting issue	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003
348.	Other	Definition	Sustaining engineering is an issue when you have IP's involved especially where it's a joint development type of activity. Response time can be critical yet dependent on a partner external to NASA	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003
349.	Other	Definition	ATP letter after SCR & RDR is not being timely provided (at times it never comes) (i.e. some cases PD receives letter a year later). Projects are at risk when they proceed without formal ATP. Also makes it hard to baseline and control requirements growth.	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
350.	Other	Definition	SCR/RDR Process needs to be consistently applied across centers between disciplines. Some RDR requirements are better suited as PDR requirements. Each center has it's own history and culture on how it defines it's own processes. Each discipline has it's own way of doing business.	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003
351.	Other	All	Development and production of the first EXPRESS Pallet is needed	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/11-14/03
352.	Other	Operations	Crews don't always have right qualifications to do science. (ex: Operating the station vs., certified to do science)	ISS	Focus Group	Code U	3/12/03
353.	Other	Strategic	Federal regulation controlling GAS program needs to be rescinded	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/12/03
354.	Other	All	Increased familiarization of PL, HD, and PD team with ISS team is required	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/24-27/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
355.	Other	All	Distribution of data to multiple users is essential for clear communication and decision making. NASA data distribution and firewall issues required that creative solutions be developed	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
356.	Other	Operations	Badging and escort policy for foreign nationals has become extremely burdensome since 9/11 and is not consistently implemented across the agency	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
357.	Other	Definition/ Development	Engineering vs., science orientation in preparing experiments. Emphases merely achieving science (requirements) as originally proposed. Emphases should be on maximizing science to take advantage of factors not understood (and therefore not addressed) by the PI at the time of proposal writing	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
358.	Other	All	Words don't match actions in encouraging "bottom-up" collaborations with international partners	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
359.	Other	All	There is a lack of long term (repeatedly flown) "parts programs" involving teams of experienced Space flight researchers. Allows researchers to build upon previous results and allows new technologies to be applied as they become available.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
360.	Other	All	Distribute resources to lowest possible level e.g. RIO that are familiar with both resources and requirements and can potential drive science to be resource-driven as opposed to requirement driven	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
361.	Other	Strategic	Conduct more ground research to implement NASA roadmaps	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
362.	Other	All	Spin off flight experiments from ground research within available resources	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
363.	Other	Strategic	Revitalization of small payloads	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
364.	Other	Strategic	Assign DoD dedicated allocation	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
365.	Other	Strategic	Maintain DoD office at JSC as single-manager for DoD payloads on Shuttle and ISS	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
366.	Other	Strategic	Continue to leverage NASA/DoD partnerships to maximize taxpayer dollars	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
367.	Other	All	Mandated Protocol for interfacing with the customer	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
368.	Other	All	Cut down on interfaces	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
369.	Other	All	Process for prioritizing payloads and allocating resources needs to be fixed	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
370.	Other	All	More emphasis on lessons learned	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
371.	Other	All	Faster response to issues	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
372.	Other	All	Common interface points more available	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
373.	Other	All	Scientists need space for creativity	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
374.	Other	Definition/ Development	Responsibility to deliver should be delegated to lowest feasible level with smallest number of rules	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
375.	Other	Definition/ Development	Allow PI time during the ground phase to develop flight bread board	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
376.	Other	Definition/ Development	Give PI freedom till RDR	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
377.	Other	All	Give people freedom to manage but also the responsibility and accountability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
378.	Other	All	Partner with industry	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
379.	Other	All	Link all documentation	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
380.	Other	All	PI not creating a lot of products to deliver but much request from may	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
381.	Other	All	No management plan that describes project management and program policy with HQ	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
382.	Other	Strategic	Code S & Y not wanting to use shuttle because they have to pay and Code U doesn't	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
383.	Program Advocacy	All	Negative management attitude at highest levels with respect to responsiveness to users	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
384.	Program Advocacy	Strategic	No consensus in goals external and internal	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
385.	Program Advocacy	All	Ownership is fragmented	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
386.	Program Advocacy	Strategic	Absence of agency wide plan for continuing space research capabilities, i.e., science/technology proposals, shuttle manifest, etc.	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
387.	Program Advocacy	Strategic	Lack of commitment to ISS as a world-class International research facility. Inconsistent and poorly articulated vision, mission and strategy for research on ISS	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
388.	Program Advocacy	Strategic	Lack of commitment to ISS as a world-class International research facility. Reductions in funding, on-orbit research capabilities, and flight opportunities	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
389.	Program Advocacy	All	Single POC at NASA-HQ for all things commercial	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
390.	Program Advocacy	Strategic	Establish a consistent commercial policy, advocacy function, evaluation criteria, pricing and use policy, prioritization scheme and selection process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
391.	Program Advocacy	Strategic	Need for more flight research for advanced technology and applications	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
392.	Program Advocacy	All	Need obvious university customer portal for universities	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/8-11/03
393.	Proposals & AO	Strategic	NASA calls for proposals such as AO's & NRA's mislead proposers about the amount of time and travel needed to complete a flight experiments	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
394.	Proposals & AO	Strategic	Lack of commitment to ISS as a world-class International research facility. Poor alignment of research prioritization with Agency needs and with possibilities for significant successes	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002
395.	Proposals & AO	Development	Multiple flight justification and approval cycles	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
396.	Proposals & AO	Definition	Selection and approval process is too long	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
397.	Proposals & AO	Definition	Peer review seems to work well, though timeliness could be improved	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
398.	Proposals & AO	Definition	Science peer review is going well but commercial review is not well established	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
399.	Proposals & AO	Definition	No clearinghouse exists for all hardware available. No method on how to share and reserve existing hardware. Previous studies have been critical for duplication of H/W development. This may be a manifesting issue	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003
400.	Proposals & AO	Definition	HQ is sometimes selecting science where science peer review may be outstanding but the technical risk is extremely high.	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003
401.	Proposals & AO	Definition	Science selection for flight research is made when Hardware or science maturity doesn't warrant the selection, i.e. technical difficulty is incompatible with schedule template.	Shuttle/ISS	Focus Group	Science Payload – Microgravity Discussion. MSFC w/Tom Smith/2-26-03	2003
402.	Proposals & AO	All	Solicitation/selection is not balanced against available resources - EX: payload development funding; mission resources (crew time, up-mass, power, etc)	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/25/03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
403.	Proposals & AO	Strategic	Through the years advertising of NRA flight opportunities, NASA continually lines up "new" PIs thought new NRA's while "old" PIs are deselected (through no fault of their own) when flight opportunities are lacking. This is a waste of time for all concerned, and leaves a bad taste in the mouth of PI's and their science teams who spent considerable time and effort only to have it come to naught	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/25/03
404.	Proposals & AO	Definition	Focus NRAs on available h/w and support equipment	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
405.	Proposals & AO	Definition	Allow PD's to provide more input on the NRAs before they are released	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
406.	Proposals & AO	Definition	Have PIs demonstrate viability of research in their proposal	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
407.	Proposals & AO	Definition	Compress and streamline the peer review, ITR,ISLSWG, and final selection processes.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
408.	Proposals & AO	Definition	Focus NRA process on existing capabilities. Now too broad in scope.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
409.	Proposals & AO	Strategic	Balance Solicitation/selection against available resources.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities,	4/22-25/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
						commercial	
410.	Proposals & AO	Strategic	Utilize REMORA small payloads	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
411.	Proposals & AO	Definition	Utilize closed loop feedback control methodology to maintain a realistic cadre of investigators	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
412.	Proposals & AO	Strategic	Be specific in NRA solicitations in matching available resources	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
413.	Proposals & AO	Strategic	Develop science consortia for ground research solicit for 5 year participation, then spin off for flight based on resource availability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
414.	Proposals & AO	Definition	Better structured NRA process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
415.	Proposals & AO	Definition	Allow PI's to propose for flight through NRA process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
416.	Proposals & AO	Definition	Strengthen flight NRA proposal requirements to include the end to end development of flight hardware, budget and schedule.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
417.	Proposals & AO	Definition	NRA & AO scope too broad which expand concept definition, phase	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
418.	Proposals & AO	Definition	PI selection criteria exists and is published in NRA but we don't use the process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
419.	Proposals & AO	Definition	Concise specific NRA focus needs to be developed currently too broad which lengthens the front end of the process (concept development)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
420.	Proposals & AO	Definition	Clarify difference between AO & NRA, do we need both	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
421.	Proposals & AO	Definition	Reduce the number of peer reviews to get to onto ISS quicker. Comment was made that flight opportunities were missed by time peer reviews were complete	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
422.	Proposals & AO	Definition	AO's are sometimes written with exclusions in certain areas, then later the opportunities become available.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
423.	Proposals & AO	Definition	Priority of International experiments on US hardware, International can reprioritize their experiments after overall US science scoring	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
424.	Proposals & AO	Definition	Decision rules for SPD in light of changing Code U Prioritization Process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
425.	Proposals & AO	Definition	No formal feedback between manifesting probability and AO, NRA selection	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
426.	Requirements	Definition/ Development	Different rules for inside versus outside customers	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
427.	Requirements	All	Numerous obstacles to users in documents, interfaces, safety constraints.	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
428.	Requirements	All	Inadequate customer comprehension of verification process and requirements	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
429.	Requirements	Development	Interface/safety verification requirements are not separately understood	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
430.	Requirements	Development	The certification requirements being applied to PD hardware have become more stringent	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
431.	Requirements	All	Get Data requests in synch with when the PD would have them., i.e., later rather than sooner.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
432.	Requirements	Definition/ Development	Extensive requirements for payload development. The amount of resources required to design, develop, test and fly a payload cause significant impacts to the customer	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
433.	Requirements	Development	Rigid requirements, excessive documentation, redundant data requests, unrealistic scheduling templates, varying interpretations of requirements/ documentation by reviewers	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
434.	Requirements	Development	Spacelab requirements, processes, and templates were more user friendly	ISS	Salzman Findings	PI/PD Commercial, University, NASA Centers, International	2001 - 2002
435.	Requirements	Development	Multiple changes in interpretation of requirements for developing ISS crew flight procedures increase researcher workload unnecessarily.	ISS	POCAAS	PI/PD Commercial, University	2002
436.	Requirements	Definition/ Development	Establishing payload/experiment requirements and feasibility - Wellness depends on team management structure	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
437.	Requirements	All	Plan to a changing design as ISS evolves	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
438.	Requirements	All	Audit and scrub ISS requirements against equivalent Spacelab documentation... pay particular attention to human factors requirements & displays.. The documentation has to be re-released or revalidated for each increment even... if the payload is flying without modification or change	ISS	POCAAS	PI/PD Commercial, University	2002
439.	Requirements	Definition/ Development	Establishing payload/experiment requirements and feasibility - need a common set of standards; the way of operating is different at each center (i.e.: some centers build payloads in house while other contract out	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
440.	Requirements	Definition/ Development	Developing and qualifying flight research systems - standardize the process	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
441.	Requirements	Definition/ Development	Developing and Qualifying flight research systems - works but is inefficient and not cost effective	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
442.	Requirements	Development	Extensive requirements for payload development. The amount of resources required to design, develop, test and fly a payload cause significant impacts to the customer	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002
443.	Requirements	Development	Weakness -Looking at the history, documents were reduced from 188 to 107 but 95% of the work remains. There is no dent in the work since the documents eliminated were duplications (resaying the documentation in yet another way)	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
444.	Requirements	Definition/ Development	Current P/L practices (not confined to P/L ops) are resulting in a document burden on the PI that is significantly greater than for SpaceLab or other past human space missions.	ISS	POCAAS	PI/PD Commercial, University	2002
445.	Requirements	Development	The ISS P/L Data Library (PDL) requires excessive researcher effort to maintain & the NASA P/L OPS personnel do not always use it.	ISS	POCAAS	PI/PD Commercial, University	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
446.	Requirements	Definition/ Development	Poor overall planning and execution of requirements	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
447.	Requirements	Development	Developing and Qualifying flight research systems - Numerous document hurdles; MDL documentation had to follow the same 27 steps as a double rack	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
448.	Requirements	Definition/ Development	Weakness - no single written procedure to get things done. Procedures are always changing; Need someone in NASA to get things done. ARC & KSC know how to get things done.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
449.	Requirements	Definition/ Development	Too many requirements levied on PI/PD team. Requirements drive cost of payload development for verification. In some cases the requirements are more stringent than those required to fly on the ISS.	ISS	Freedom to Manage	NASA Process Owners, PIs/PDs, universities, commercial	2002
450.	Requirements	Definition/ Development	Weakness - system redundancy demands if customer flies same experiment 3 times, have to do all the paperwork 3 times.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
451.	Requirements	Definition/ Development	Weakness - takes 5/6 feet of paper to reply the same payload; get rid of the paperwork & streamline; decrease paperwork without comprising quality or safety	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
452.	Requirements	All	Weakness - NASA not using own process. If want data/test, they call customer directly. Customer does not have budget to accommodate all the calls. Funding is limited. If customer submits data to PIM questions should go to that PIM from that point on. Calls still come in even after customer guides callers to PIM. I	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
453.	Requirements	Definition/ Development	Weakness - input data closer to flight 2 -3 months. No one reviews the data it is just a tick mark on a schedule.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
454.	Requirements	Development	Weakness - things have gone in wrong direction since Spacelab. Integration process in excess since Spacelab; money and time spent doesn't add value. Requirements have expanded exponentially; took more staff than to develop the hardware	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
455.	Requirements	All	Weakness - PDs only spend 5% of time doing science; rest of time is processing paperwork/requirements. Customer needs help; shouldn't be the slave to NASA or the process. Requirements have good intent but dump on PD who has no time or money to do it.	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
456.	Requirements	All	Revisit requirement that exceed SSP standards	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
457.	Requirements	All	Reduce re-verification effort required	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
458.	Requirements	All	Real reduction in requirements	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
459.	Requirements	Definition/ Development	Streamline the RCAR Process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
460.	Requirements	All	Improve initial data collection/management of payload resources requirements and development of IDRD/PTP Annex 5 tables	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
461.	Requirements	Definition/ Development	Let PI declare when it is time to freeze requirements and hold the RDR	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
462.	Requirements	All	Ensure the right level of requirements at each I/F. Mechanism of evaluation should be put in place.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
463.	Requirements	Integration	Too many requirements, assumptions, too conservative, that drive up cost to customer	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
464.	Requirements	Integration	Acknowledge documentation - Same data input over and over, Too much in total	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
465.	Requirements	Integration	Technical Requirements imposed but not required for CoFR	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
466.	Requirements	Integration	PI's have to figure out which ISS program documents are applicable to their specific payload (all are not applicable but resources are required to determine which are applicable)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
467.	Requirements	All	PI requirements constantly change – all phases A-D. Amount of time the project phases are stretching allows customer requirements changes	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
468.	Requirements	All	The NASA System (Programs, projects, etc.) requirements are changing too much (MELFI example). No stability for the PI's which causes cost increases to payload development	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
469.	Requirements	All	Technical interfaces not stabilized until late in the process	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
470.	Requirements	All	Interface issues during concept development	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
471.	Requirements	All	Document sign off is not happening in a timely manner (examples were discussed where project plans either never get signed off or get signed off during late in the implementation phase)	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
472.	Resources	All	Low and unstable funding for SSF Payloads	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
473.	Resources	All	Provide stable, adequate budgets for projects with adequate reserves controlled by the Project Manager	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
474.	Resources	Strategic	Weakness - Encourage more crew availability	ISS	JSC Customer Needs Assessment	PI's/PD's, NASA, commercial, university, international	2002
475.	Resources	Strategic	Resources required to perform research (transportation, and on-orbit resources) are too limited to support all planned research on the ISS. Limited resources make manifests highly dynamic, leading to frustration in the payload community. PIs/PDs have little assurance that their payload will really fly even if they are manifested	ISS	Freedom to Manage	PIs and PDs	2002
476.	Resources	Strategic	Lack of reliable, routine access	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
477.	Resources	All	Preparing and allocating budgets - too much duplication	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
478.	Resources	All	Preparing and allocating budgets - decided that NGO must prepare the budget request	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
479.	Resources	Strategic	Instability in the budget	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
480.	Resources	Strategic	Insufficient funding	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
481.	Resources	Strategic	Maintaining and Sustaining Flight Research Systems - limited environment, no basis for other racks consistent with crew time, upmass, budget for spares	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
482.	Resources	Operations	Limited on board resources. The payloads requirements are challenged and reduced to the core of the experiment with other goals listed as "highly desire" or "desired".	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
483.	Resources	All	Maintaining and Sustaining Flight Research Systems - concern with time, budget, allocation of consumables	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
484.	Resources	All	Reserves controlled by project manager – not payload developer	Shuttle/ISS	Focus Group	PI's/PD's, NASA, commercial, university, international	2003
485.	Resources	Strategic	Stability in the budget that allows for long-term partnerships to be established and sustained with industry.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/11-14/03
486.	Resources	All	Clear definition and funding for all operations needs to be defined prior to launch	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	3/24-27/03
487.	Resources	All	Develop Operations Summary that projects resources available to utilization	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	5/20-23/03
488.	Resources	All	Budget stability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
489.	Resources	All	Limited crew time and priorities	ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
490.	Resources	Strategic	Need to do away with earmarks. NIH policy against earmarks.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
491.	Resources	All	Programs not stable – a lot of replanning	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
492.	Resources	All	Budget instability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
493.	Resources	All	Costing of grants is huge problem. NASA has inconsistency between contract and grants to fund PI's. Best system is grants, however costing requires large overhead for grant processing & costing both on NASA centers and PIs. Fix: cost grant upon selection	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
494.	Resources	All	OBPR doesn't emphasize life cycle cost	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
495.	Safety	Development	Payload flight safety review process has become an exhaustive audit	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
496.	Safety	Development	NASA program safety requirements/ processes are not consistent	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
497.	Safety	Development	Safety implementation is open to interpretation	Shuttle	Space Station Freedom Continuous Improvement Customer Support Team	Spacelab PI's/PD's, NASA, University, International, Commercial	1991
498.	Safety	Definition	There is a lack of safety participation during the user design review process	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
499.	Safety	Development	The number of safety reviews increases when dealing across NASA Centers in two instances: 1) One Center is the PED and another is the Missions Management Org. 2) The sponsoring Center performs a review of the safety packages prior to the Flight or Ground Safety Review Panels	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
500.	Safety	Development	Many PD's flying series/reflow hardware have extra tracking documentation when the original safety review was performed on an integrated package, such as is developed for many of the Spacelab missions	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
501.	Safety	Development	Weakness - USA safety related handbooks are not available to payload customers to understand the requirements for the pad and OPF. Was told to comply with safety documentation, but couldn't access the web. USA document GSOP5400 could not get to on the web.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
502.	Safety	Development	Weakness - Contractor's safety personnel waited until last minute flag possible problems which caused extra work and possible work stoppage	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
503.	Safety	Development	Weakness - Customers need a clear education on what SR&QA expects. Spot audits on certain procedures would accomplish the same objective and build a trusting relationship between KSC & customer.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
504.	Safety	Development	Weakness - did not feel contractor safety work as a team. KSC safety had to intervene. No need for them to be middleman.	ISS/ Shuttle Primarily ISS	KSC Customer Survey 2001, 2002	PI's/PD's, NASA, commercial, university, international plus JSC Program Office	2002
505.	Safety	Definition/ Development	Certifying safety of research flight and ground systems - get safety involved early in the payload design process	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
506.	Safety	Development	Certifying safety of research flight and ground systems -staff up the safety office	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
507.	Safety	Definition/ Development	Certifying safety of research flight and ground systems - establish uniform safety processes among centers	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
508.	Safety	Definition/ Development	Certifying safety of research flight and ground systems - Develop an orientation program for new PI's and PD's	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
509.	Safety	Definition/ Development	Developing and Qualifying flight research systems - Differing safety standards	ISS	Cocoa Beach User Workshop	PI's/PD's, NASA, commercial, university, international	2002
510.	Safety	All	Protect lives and equipments with rules and requirements	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
511.	Safety One NASA	Development	The number of safety reviews increases when dealing across NASA Centers in two instances: 1) One Center is the PED and another is the Missions Management Org. 2) The sponsoring Center performs a review of the safety packages prior to the Flight or Ground Safety Review Panels	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997
512.	Safety One NASA	Development	Weakness - Requirement of technical physicals to operate Payload equipment at KSC. Recognize GSFC fall protection training to satisfy KSC requirement.	Shuttle	KSC Customer Survey 2001, 2002	NASA Center	2002
513.	Safety One NASA	Definition/ Development	Keep safety under control of PSRP. Use other agency boards in an advisory capacity.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
514.	Safety One NASA	Integration	Multiple Center safety processes (JSC Flight and KSC Ground) Example, if you go to JSC first then to KSC, no ground package should be needed.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
515.	Selection	Strategic	Increase priority of Microgravity Research within the agency and center, backing this increased priority with sufficient resources to accomplish assignments on schedule	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	2/24-27/03
516.	Selection	Strategic	Enable research programs to develop unique approaches to accomplishing science, including breaking current NRA paradigm	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	4/22-25/03
517.	Selection	All	Do the right research	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
518.	Selection	All	Match requirement with capability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
519.	Selection	All	Robotic vehicles when feasible	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
520.	Selection	All	Human tended vehicles only when necessary	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
521.	Selection	Definition/ Development	Multiple investigations per piece of hardware	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
522.	Selection	Definition	Only select ground experiments. Demand the PI's reach the ground limit in his research and understand in detail what he must seek in terms of requirements in the flight experiment.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
523.	Selection	Definition	Use high power scientists to review and select the flight PI's	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
524.	Selection	Definition	Contract with PI should never exceed 3 pages	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
525.	Selection	All	Let PI select PM	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	6/16-19/03
526.	Selection	Definition/ Development	Advantage of Code S confirmation vs. process that might be more broadly applied across agency. All parties need to make a commitment on launch date and payload development cost, etc.	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
527.	Selection Oversell	Strategic	Experiments are selected but are not manifested or cannot meet the target manifest	Shuttle/ISS	Payload Engineering Processing Study Phase A, Nygren & Havens	Targeted PI/PD's	1997

Appendix C

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
528.	Selection Oversell	Strategic	Lack of Flight Opportunities. Payload customers already in the queue have a backlog resulting in unanticipated costs to the customers, science/technology to become dated and uncertainty to ripple through the subsequent payload selections. Payload customers are given an unrealistic expectation for manifesting	Shuttle	Shuttle Payload Office Customer Feedback/ Freedom to Manage	Shuttle Customer	2002
529.	Selection Oversell	All	Resolution of conflicting demands on utilization resources (science, commercial, national security, education, IMAX)	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/11-14/03
530.	Selection Oversell	Strategic	Acknowledgement that high priority international barter and national or NASA payload commitments may exceed the Code M RPO 10% pressurized allocation	ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	3/11-14/03
531.	Selection Oversell	Strategic	Flight rate decreased but process didn't change to turn off marketing & payload selection	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	Feb-03
532.	Selection Oversell	Strategic	CSC's may over market our ISS capability	Shuttle/ISS	Focus Group	NASA Process Owners, Pls/PDs, universities, commercial	Feb-03

#	Issue Type	Phase of the Process	Customer Feedback Summary	Shuttle or ISS	Source	Customer Group	Time frame
533.	Selection Oversell	Strategic	Too many payloads in the queue for the capability available. PI's in holding pattern awaiting on capability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
534.	Selection Oversell	Strategic	Holding PI's in various phases (mostly phase B) due to funding issues and capability availability issues is very frustrating for the PI's	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03
535.	Selection Oversell	Strategic	HQ has metrics on number of PI's selectedmay influence overselling the capability	Shuttle/ISS	Focus Group	NASA Process Owners, PIs/PDs, universities, commercial	Feb-03

THIS PAGE INTENTIONALLY BLANK

Previous Studies

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
1.	Cycle Time Too Long	No Finding	Shorten and simplify program planning: reduce the consolidated operations and utilization from 5 to 4 years, reduce the tactical planning template from 36 to 24 months, and move the baselining of increment-specific detailed requirements (increment definition and requirements document) from I-24 to I-9 months. Assembly requirements are baselined at I-24 months	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	Payload Tactical Plan (Research manifest) is baselined at I-16 months. Efforts are underway to further streamline. IDRD is baselined at I-16 months.	
2.	Cycle Time Too Long	No Finding	Reduce the work templates associated with Cargo/Payload Integration and preflight testing to begin L-9 months, by assembly complete time frame	Utilization, Operations, and Training assessment Team (UOTAT)	1995	In Work	Currently at I - 16 months	
3.	Cycle Time Too Long	No Finding	Reduce increment operations planning from 18 to 9 months thus reducing the number of planning cycles from 3 to 1	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	Planning cycles have been reduced from 3 to 2. Planning has been reduced to I-12 months. Preliminary Payload planning inputs are required at I-12 to support a I-7 month baseline with all payload activities including partners. The final timeline is baselined at I-2.5 months.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
4.	Cycle Time Too Long	No Finding	Provide more timely response, or conditional approval to a PI's proposal evaluation/selection	Microgravity Research Program Study, 1999	1999	Yes	Implemented 150 days from proposed receipt to letter of selection (covers both ground and flight and new category ground/flights.	2001
5.	Cycle Time Too Long	No Finding	Establish criteria to be used as authority for granting a PI permission to proceed through the formulation phase to RDR without a SCR	Microgravity Research Program Study, 1999	1999	No	NRAs are annual with flight criteria, ground criteria, and a hybrid. No exceptions to process.	
6.	Cycle Time Too Long	No Finding	Enable PI's who successfully complete ground research to progress into flight program without having to recompet through another NRA	Microgravity Research Program Study, 1999	1999	No	NRAs are annual with flight criteria, ground criteria, and a hybrid. No exceptions to process.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
7.	Inefficient Integration	Integration of a payload into the Shuttle and the ISS should be as seamless as possible. The Shuttle and ISS programs have similar and redundant integration processes. The consolidation of the user integration/utilization processes into a single function will eliminate this program integration redundancy & minimize costs.	The ISS payloads office, in concert with the Space Shuttle Customer Integration Office, to initiate a review for combining integration processes. The Shuttle and ISS programs to initiate a long-term review to identify areas for consolidation between programs	Payload Engineering Processing Study Phase A & B	Nov-97	No	Although processes are different, ISS users only have to interface with the ISS Payloads Office. Both ISS Payloads & Shuttle Integration have combined processes such as manifesting. Safety processes are same for both Programs.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
8.	Inefficient Integration Process	The forecast length of time for research selection, development, and integration is excessive. The 36 month payload integration timeline, currently projected by ISSPO, is excessive for the Operations phase. If it is not reduced significantly, the timeline will increase the cost of operations and severely constrain the research opportunities available on the station.	NASA should begin planning for simple to complex payload integration timelines. NASA should immediately begin developing research integration plans for the Operations Phase of the ISS program. These plans should establish payload categorized templates that are responsive to research area needs, can influence the payload hardware design, and can standardize the scenarios in which ISS facility-class payloads and onboard operational racks are in service. As a goal, conducting research on the ISS should be no more difficult than conducting research in a ground-based facility, except for the transportation.	ISS Operations Architecture Study - Cox	1999/2000	No	Not fully endorsed as a priority by NASA.	
9.	Inefficient Integration process	In some cases the NASA technical support to the PDR's and CDR's has deteriorated to the point where the value added is questionable	Decrease the number of reviews commensurate with the complexity of the hardware	Payload Engineering Processing Study Phase A & B	Nov-97	No	No longer an issue because core team attends PDRs/CDRs	
10.	Inefficient Integration process	The Payload Investigators, PDs, and RPOs have varying degrees of insight and knowledge of the ISS payloads integration process.	Develop the users guide as a web document. The users guide website should provide the reader links to the responsible offices for email feedback of questions and recommendations back to the offices that produce the various sections.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	The ISS Payloads Office developed an information Source CD and website that acts as user's guide to Station Utilization.	October 2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
11.	Inefficient Integration Process	Payload documents are signed and controlled at a high level (at the Payload Control Board level), for example the PIA is co-signed by the RPO & the ISS Payloads Office	Payload documentation should be signed and controlled at the lowest level possible. Review signature levels and reflect updates in the Payload Users Guide	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Only level 1 interfaces affecting interfaces to the ISS, affecting other payloads, or are cost driving changes are controlled at the Payloads Control Board. Otherwise, documentation has been delegated to lower level working groups.	2000
12.	Inefficient Integration Process	The ISS payloads planning template initiates as early as L-66 months. The user does not have sufficient insight into the payload complement that far in advance. Facility class strategic planning requires the greatest amount of analysis. The ISS process does not distinguish between the payload information required for facility class and sub rack payloads. This requires users to provide data well in advance of actual data knowledge. This input requires premature resource utilization	The ISS payloads office should revisit planning process to distinguish between requirements need dates for facility and sub-rack class payloads.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	The ISS Payloads Office has rewritten facility and sub rack template document SSP 57057 and due dates have been shortened. The document is currently being revised with latest process improvements. Estimated completion is June 2003	2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
13.	Inefficient Integration Process	The ISS Program office requests submittal of high fidelity data on sub-rack payloads in advance of definition of the space station interface definition and requirements. Examples include software, safety critical structures, launch environments, and verification requirements.	ISS Payloads Office has placed a priority on the establishment and baselining of payload to ISS interface requirements and interface control and verification documents to provide to the users	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Template has been rebaselined. High fidelity data due dates have been compressed. Verification data is not required until 1-7.5 months as compared to 1-18 months in the past	2002
14.	Inefficient Integration Process	The ISSP payload integration process, including the schedule template is very complicated and lengthy for the user.	ISS payload office should reexamine the payload integration process, including the template time of the users involvement after ISS flights commence. The ISS Program process improvement team needs to include the Space Shuttle Program due to it recent template reduction effort.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	The ISS Payloads Office has rewritten facility and sub rack template document SSP 57057 and due dates have been shortened. The document is currently being revised with latest process improvements. Estimated completion is June 2003	2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
15.	Inefficient Integration Process	The program is developing PDL and URC. There are concerns that these systems may become so large and complex that they will become a hindrance to streamlined payload integration, that they will become increasingly costly to the Program, and that they will not be user friendly. It is observed that the two systems may call for the same data, but the systems aren't linked. Nor is the method of configuration management of the data content clear.	The program should take note of the stated concerns and guard against their realization. More specifically, the program should take steps to combine these systems or otherwise ensure their consistency and to implement effective and clear configuration management	Payload Engineering Processing Study Phase A & B	Nov-97	In Work	The Payloads Office has worked to streamline and interface tools where possible. Users are very satisfied with URC interface. Forward actions are in place to review all requirements on PDL, and simplify the tool. The kick off is a user face to face in April 2003	Dec-03
16.	Inefficient Integration Process	The customer community has identified verification as an area of significant cost. The distinction between interface verification and safety verification is not well understood	Provide educational products for verification which discuss, the differences between safety and verification, an overview of the verification process, examples of verification requirements interpretations	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	In Work	This is included in the forward actions being worked as part of the ISS Payloads Office Process Improvements.	Jun-03

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
17.	Inefficient Integration Process	Length, complexity, and costs of process discourages customers, insufficient flexibility within process, limited effective communication opportunities with users, differing priorities placed on different payload types, circumvention of established integration process. The payload integration process can be improved to be more equitable, more flexible, less burdensome, and less costly to customers. The customer interface positions in the integrating organizations are critical elements for customer satisfaction and integration efficiency.	Charter a Process Action Team to analyze and recommend improvements to the SSF integration process.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Though no PAT was established, the ISS Payloads Office has established a customer service team to provide feedback and corrective action review based on post increment surveys and customer service help line feedback	Feb-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
18.	Inefficient Integration Process	Length, complexity, and costs of process discourages customers, insufficient flexibility within process, limited effective communication opportunities with users, differing priorities placed on different payload types, circumvention of established integration process. The payload integration process can be improved to be more equitable, more flexible, less burdensome, and less costly to customers. The customer interface positions in the integrating organizations are critical elements for customer satisfaction and integration efficiency.	Use a documentation system with a basic "primer" to provide an overview of the integration process	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Yes, Payload Information CD and website.	Oct-02

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
19.	Inefficient Integration Process	Length, complexity, and costs of process discourages customers, insufficient flexibility within process, limited effective communication opportunities with users, differing priorities placed on different payload types, circumvention of established integration process. The payload integration process can be improved to be more equitable, more flexible, less burdensome, and less costly to customers. The customer interface positions in the integrating organizations are critical elements for customer satisfaction and integration efficiency.	Establish a study of the DTO/DSO process for the purpose of maximizing its capability and applicability under the appropriate set of management oversights and procedures	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	Recommendations were turned over to SSF Program for implementation. The Program was on the team but didn't have time to support so didn't have buy in to recommendations. Dr. Lenoir, the AA advocate for the study left NASA.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
20.	Inefficient Integration Process	ISS researchers find the payload integration process, including payload operations to be unnecessarily and discouragingly difficult. Researchers judge the reflight of a Shuttle or Spacelab payload on ISS to be 2 to 4 times more difficult than the original flight on Shuttle/Spacelab.	Reengineer and streamline the payload integration process, including payload operations	POCAAS	Feb-02	In Work	ISS Payloads Office has greatly improved the process and has forward actions under way to further improve.	Dec-03
21.	Inefficient Integration Process	Payload Operations are a relatively small component of ISS cost	Considering the interaction among all payload integration activities, and the researcher issues, reduction in payload operations cost should be undertaken as part of a larger streamlining of ISS Payload Integration	POCAAS	Feb-02	In Work	ISS Payloads Office has greatly improved the process and has forward actions under way to further improve.	Dec-03

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
22.	Inefficient Integration Process	Payload Operations cost can be reduced if a combination of actions is taken. Program requirements must be modified to allow alternative implementations. Program standards must be modified or interpreted to focus on intent, not rigid adherence (e.g. detailed formatting of crew displays and procedures). Information exchange requirements among ISS organizations and with researchers must be streamlined to be more effective, less formal, and less redundant., Operational processes & approval processes must be further simplified.	Budget reduction should be preceded by a definitive program action, working with the research community, to identify and define specific changes to reduce complexity, increase flexibility, and reduce cost.	POCAAS	Feb-02	In Work	ISS Payloads Office has greatly improved the process and has forward actions under way to further improve.	Dec-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
23.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed	Grandfather in procedures from previous flights (Shuttle, etc.). Allow the crew training document people to reclude themselves if the PI/PD and the crew agree at the first meeting. For new payloads, minimize the impact of the crew procedure group because it takes the PI/PD large sums of money and time to satisfy trivial requirements.	POCAAS	Feb-02	In Work	Where possible, grandfathering has been accommodated. Procedures for ISS can be used on Shuttle. Much work has been done and forward actions are in place to ensure reflight payload process is simplified	Dec-03
24.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed	Grandfather in SSP payloads to fly with their existing documentation or make the ISS and SSP formats the same where applicable.	POCAAS	Feb-02	In Work	Where possible, grandfathering has been accommodated. Procedures for ISS can be used on Shuttle. Much work has been done and forward actions are in place to ensure reflight payload process is simplified	
25.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed	Seven months prior to start of an increment is fine for new experiment systems but the program should have a more realistic time requirement for re-flight experiment procedures such as 3 or 4 months prior to start of an increment	POCAAS	Feb-02	Yes	This has been implemented for reflights with little to no changes	2002
26.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed	Institute a clear process for configuration control of experiment procedures onboard	POCAAS	Feb-02	Yes	Process established for baselining crew procedures	2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
27.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed	Delete some of the mandatory reviewers of Op Nom processes as well as other procedure ECR/TCM reviews or tell them to pick up the pace.	POCAAS	Feb-02	In Work	Ops NOM process has been simplified in recent ISS Payloads Office process improvement efforts.	2002/2003
28.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed. Payload Display Review Panel	This function should stop with display and procedures standards. Payload developers should be able to follow the standard without a NASA tutorial service	POCAAS	Feb-02	No	Displays reviews are still conducted, though efforts have been put in place to streamline and simplify. To delete this review would require crew office consensus and gets into "risk". Not currently implemented.	
29.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed. Payload Display Review Panel review process is long and expensive luxury.	Eliminate this function. If the crew cannot operate the display or application because it is unusable, then it will only hurt the PD. Therefore PD is motivated to follow the standard to a reasonable degree	POCAAS	Feb-02	No	Displays reviews are still conducted, though efforts have been put in place to streamline and simplify. To delete this review would require crew office consensus and gets into "risk". Not currently implemented.	
30.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed. Payload Display Review Panel review process is long and expensive luxury.	Eliminate the mini-team appointed by PDRP to review the displays & procedures for standards compliance and operation issues.	POCAAS	Feb-02	No	Displays reviews are still conducted, though efforts have been put in place to streamline and simplify. To delete this review would require crew office consensus and gets into "risk". Not currently implemented.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
31.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed. Payload Display Review Panel review process is long and expensive luxury.	Eliminate the usability evaluation conducted by Mini-team with crew office personnel. Crew will have chance to work with the display or procedure during training and any minor problems could be corrected subsequent to initial crew exposure	POCAAS	Feb-02	No	Usability reviews are still conducted, though efforts have been put in place to streamline and simplify. To delete this review would require crew office consensus and gets into "risk". Not currently implemented.	
32.	Inefficient Integration Process	Payload Operations Requirements need to be reduced/relaxed. Payload Display Review Panel review process is long and expensive luxury.	Greatly modify (downsize to eliminate) the MSFC Payload Authorization Process to save time, money, and excessive documentation & grief for PI/PD.	POCAAS	Feb-02	No	Payload Display Review Panels are still conducted, though efforts have been put in place to streamline and simplify. To delete this review would require crew office consensus and gets into "risk". Not currently implemented.	
33.	Inefficient Integration Process	Multiple inputs of same data	Have a payload EIA that is not increment/flight specific	POCAAS	Feb-02	No	Being assessed in forward actions for 2003 for the ISS Payloads Office.	Dec-03
34.	Inefficient Integration Process	Multiple inputs of same data	Have a payload ICDs and PVPs that is not increment/flight specific.	POCAAS	Feb-02	No	Currently under review in ISS Payloads Office forward actions	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
35.	Inefficient Integration Process	Lack of coordination of teams regarding PTCS/FCU testing.	Name a NASA lead to handle this coordination. Develop a document a well defined and streamlined process to include more communication prior to on dock at KSC. Provide a way to test between the PD remote site and MSFC prior to on dock at KSC to work out commanding/telemetry issues prior to testing. Make the flight commanding, telemetry, and EHS versions available and in sync with the KSC PTCS testing schedule.	POCAAS	Feb-02	No	KSC has the capability to provide a test between the PD remote site and KSC while hardware is being checked out in PTCS. If there is a requirement to test early, Payload Developers could submit this requirement to the PSCP requesting an earlier drop of the EHS database to support such a test. The Payload Developer would be required to submit C&DH data earlier to support an early drop of EHS.	
36.	Inefficient Integration process	The ScS was not designed to be a verification tool that it is now trying to be. This is an incomplete verification test bed for subrack payloads	Implement the suitcase simulator items and convert one of the MSFC EXPRESS racks into a tester that can connect into the HOSC for commanding/telemetry/H-S processing so PDs can checkout their payload interfaces prior to going to KSC	POCAAS	Feb-02	No	An assessment was performed on expanding POIC capability to interface with remote sites for early checkout of command/telemetry databases. Risk assessment determined there was low risk associated with being able to correct the database if a problem is found at KSC as compared to costs of early checkout implementation.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
37.	Inefficient Integration Process	NASA Data Review: there is a lag between PDs data submittal and receiving comments. Everyone wants data and now, but when you give it to them, they only check off a box.	Re-examine at the template dates and only ask for data in a time frame that NASA can provide the appropriate personnel to review this information	POCAAS	Feb-02	Yes	The ISS Payloads Office has rewritten facility and subrack template document SSP 57057 and due dates have been shortened. The document is currently being revised with latest process improvements. Estimated completion is June 2003	2002
38.	Inefficient Integration Process	The label process/requirements keep changing	Get the crew office, the human factors people, the decal lab, and some PDs together and define something we can live with and grandfather the current payloads	POCAAS	Feb-02	Yes	Have instituted a Human Factors Integration Team that looks at labels/human factors verification and submits report for Payload Developers. Very well received by Payload Developers.	Feb-03

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
39.	Inefficient Integration Process	C&DH telemetry database out of phase with PD's verification needs. The availability of the C&DH telemetry database, which is utilized by the TREK in the verification/checkout process, is out of sync with the needs of PDs	PDs would like to request that this process be reevaluated based upon the end-users needs. As it stands today, this database must be created by hand, which is very labor intensive	POCAAS	Feb-02	No	An assessment was performed on expanding POIC capability to interface with remote sites for early checkout of command/telemetry databases. Risk assessment determined there was low risk associated with being able to correct the database if a problem is found at KSC as compared to costs of early checkout implementation. If a PD has specific concerns, these can be addressed at the PSCP on a case-by-case basis.	
40.	Inefficient Integration Process	It is difficult to determine where the current SODF and PODF procedures are available, thus, some old ones were used to build simulation/training libraries	Institute a clear process for configuration control of experiment procedures onboard and on the ground.	POCAAS	Feb-02	Yes		

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
41.	Inefficient Integration Process	ISS Payload Label Approval Team (IPLAT) Requirements	Greatly reduce the authority of ISS Payload Label Approval Team (IPLAT) Requirements. Mandate that the IPLAT people who interpret the requirement fully understand the ramifications of their direction, which is sometimes at variance with the requirement. Eliminate the interpretation of IPLAT to change the requirements. No one cares if the ink lettering around a switch grouping is squared off or has rounded corners. Also, lets use some common sense so we don't waste the time of the PI, the Payload Developer, and the program manager because the program manager and the integration engineer have to send emails and letters to the IPLAT. We do not need a label police. This is clearly a case of time and money being wasted.	POCAAS	Feb-02	No	IPLAT is still in place but ISS Payloads Office approved an integrated approach to IPLAT/OPNOM/IMS labels to simplify integration. Also Human Factors Team established, which verifies human factor requirements and labels for the payload developer.	Feb. 2003

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
42.	Inefficient Integration Process	ISS Payload Label Approval Team (IPLAT) Requirements	Lets get IPLAT and the crew on the same page so that needless emails and letters are not needed to resolve non-issues. The IPLAT request is understandable; however, the crew will operate the payload, and if the crew and the PI/PD are comfortable with the switch functions, there is joy	POCAAS	Feb-02	Yes	ISS Payloads Office process improvements forward actions included an integrated approach to IPLAT, OpsNom, and IMS. This integrated approach was approved to be implemented on February 28, 2003. In addition, a Human Factors Integration Team was initiated to help developers through verification of labels and human factors requirements.	Feb-03
43.	Inefficient Integration Process	ISS Payload Label Approval Team (IPLAT) Requirements	We do not need to overcomplicate simple procedures. Video recorders are standard, and there is no need to modify COTS cassette tapes with insertion instructions for the crew	POCAAS	Feb-02	In Work	Agree standard items do not need extensive verification. All Human factors verification items are under review. In addition, a Human Factors Integration Team was initiated to help developers through verification of labels and human factors requirements.	Jun-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
44.	Inefficient Integration Process	ISS Payload Label Approval Team (IPLAT) Requirements	We need to rely more on the crew and their inputs. If at crew training, the crew is happy with the labeling, and the PI/PD is confident that the crew understands the hardware and is comfortable with it, it is not clear why IPLAT is needed for this specific example.	POCAAS	Feb-02	In work	ISS Payloads Office process improvements forward actions included an integrated approach to IPLAT, OpsNom, and IMS. This integrated approach was approved to be implemented on February 28, 2003. In addition, a Human Factors Integration Team was initiated to help developers through verification of labels and human factors requirements.	Jun-03
45.	Inefficient Integration process	Express integration teams at times take too long to evaluate the submitted verification data	Speed up processes on MSFC side	POCAAS	Feb-02	In Work	In review as part of verification scrub. This is helped by establishment of a Human Factors Integration Team	Jun-03

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
46.	Inefficient Integration Process	There is a lack of clear integration process for payload developers. The amount of ISS documentation is excessive and is spread out over a vast number of different organizations. Several years ago an ISS engineering study team chaired by the current ISS payload manager identified this issue as one of their primary findings in the final report. To date, a detailed user handbook still does not exist	Develop a meaningful user handbook that can be used by the PD as a guide through the process	POCAAS	Feb-02	Yes	Payload CD and website is now available	Oct-02
47.	Inefficient Integration process	PD's are required to resubmit PIRNs for every flight (even while you are on-orbit)	The PD submits a PIRN with the System/element affected and stage effectivity filled to cover the launch through the return flight or through the planned reflights	POCAAS	Feb-02	In Work	Currently being addressed as part of forward actions in ISS Payloads Office Process Improvements	Dec-03
48.	Inefficient Integration process	PD's are required to resubmit COFR for every flight, even if they are just staying on-orbit	The PD submits one COFR to cover the payload launch, on-orbit and return flights	POCAAS	Feb-02	In Work	Currently being addressed as part of forward actions in ISS Payloads Office Process Improvements	Dec-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
49.	Inefficient Integration process	PD's are required to input data into flights and increments and if the flight moves, the PDs have to move the data. This is inefficient and subject to human error.	Have the PD input data for a payload rather than for a particular flight/increment	POCAAS	Feb-02	In Work	Currently being addressed as part of forward actions in ISS Payloads Office Process Improvements	Dec-03
50.	Inefficient Integration process	Some of the PDs hardware is moved from one flight to the other. The PD must then go delete this data from one place and add it to another.	If the program pre-positions hardware from one flight to the other, they should handle having these items moved within PDL, while keeping the PD in the loop. Develop capability within PDL to enable the PDs to copy their own data between flights/increments and their associated payload accounts	POCAAS	Feb-02	In Work	Forward actions are in place to review all requirements on PDL, and simplify the tool. The kick off is a user face to face in April 2003	Dec-03
51.	Inefficient Integration process	In our experience, payload information was not included for the return flight increment. Thus when an early transition to the next increment was performed, the system lost the ability for processing the current on orbit payloads health/status, telemetry, and commands	Include payloads in the database for their return flight or next increment for early transition process	POCAAS	Feb-02	In Work	Forward actions are in place to review all requirements on PDL, and simplify the tool. The kick off is a user face to face in April 2003	Dec-03

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
52.	Inefficient Integration Process	No Finding	Standardize all associated program documentation and use network PC-based system to receive and document cargo/payload requirements	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	All Program documentation is standardized and web-based tools are used to collect data requirements.	1999
53.	Inefficient Integration Process	No Finding	Further utilization of on-console operations personnel to develop increment utilization products for Station Planning. This implements "just in time" planning approach where minimal utilization planning products and time lines are developed pre-increment	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	This is how planning is done today	2000
54.	Inefficient Integration Process	No Finding	Eliminate the POIC unique planning tool. The POIC and the SSCC will use the same tool	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	The MCC-H uses CPS and POIC uses a more detailed planning enhancement to CPS called PPS, which imports and exports to CPS. This tool is fully developed and operational	
55.	Inefficient Integration Process	No Finding	POIC will rely on U.S users and the International Partners to plan and conduct operations for their payloads	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	Fully implemented in Partner Operations Study conducted in 2002.	2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
56.	Inefficient Integration Process	No Finding	Standardize approach and content for design reviews	Microgravity Research Program Study, 1999	1999	Yes	Standardized approach is in place for Microgravity.	2000
57.	Inefficient Integration Process - crew	Crew procedure standards keep changing	Go to guide lines while maintaining all safety considerations. Consider crew inputs but then use common sense and explain why what the PI/PD has designed is OK and will work	POCAAS	Feb-02	No	Standards have stabilized but are still considered requirements. A tiger team was put in place to assess these standards and concluded the standards are reasonable. Efforts have been in place to ensure consistent, reasonable adherence is put in place.	
58.	Inefficient Integration Process - crew	The ISS program requires payload simulators be delivered to JSC. This can be very costly in development of high-fidelity equipment that many be utilized for a few hours during crew payload training	It is less costly for a project to maintain a qualification unit, as a training device, for internal use and ship it to the training facility when needed	POCAAS	Feb-02	Yes	No longer require complex trainers	2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
59.	Inefficient Integration Process - crew	Payload training is very limited and performed too far in advance of flight. Therefore, hardware must be developed/readied well in advance, which results in added cost to the project. The other risk is payloads could complete hardware development after training and jeopardize experiment success because of crew unfamiliarity.	Properly integrate training requirements into the development schedule of the experiment payload on a case by case basis on factors such as complexity, whether the experiment has flown before, etc.	POCAAS	Feb-02	Yes	This is accomplished through the Training Strategy Team	2002
60.	Inefficient Integration Process - PDL	A lot of effort gets put in for updating data into PDL. But the people who need data don't use effectively.	If going to have a PDL, make it easier for other NASA groups and NASA contractors to obtain data. Also mandate that all requests for payload information be obtained from PDL. The PI/PD should be contacted only as a last resort	POCAAS	Feb-02	In Work	Forward actions are in place to review all requirements on PDL, and simplify the tool. The kick off is a user face to face in April 2003	Dec-03
61.	Inefficient Integration Process - PDL	PDL is costly to maintain data input, configuration management is unclear, etc.	The ideal solution would be a data library function that can be maintained on the PD's machine with inputs/updates being periodically uploaded to the PDL or database system when necessary.	POCAAS	Feb-02	In Work	Forward actions are in place to review all requirements on PDL, and simplify the tool. The kick off is a user face to face in April 2003	Dec-03
62.	Inefficient Integration Process- crew	Payload Operations Requirements need to be reduced/relaxed	Eliminate the requirement for crew procedure training certification for all payloads that have previously flown and trained crews	POCAAS	Feb-02	Yes	No recert required	2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
63.	Inefficient Integration process- PDL	PDL not keeping up with baseline documentation	Provide direction to PDL to revise its system as ISS documentation is revised. Update the PDL blank book to reflect current design	POCAAS	Feb-02	In Work	Forward actions are in place to review all requirements on PDL, and simplify the tool. The kick off is a user face to face in April 2003	Dec-03
64.	Inefficient Integration process-crew procedures	Procedures development is a long, drawn-out process with too many iterations and people involved	Model procedures development after the SPACEHAB process. NASA develop standardized electronic template for the procedures and provide to PI team. PI teams develop a good first draft, limit the iterations of the procedures reviews, do not change reflight procedures when the experiment is reflow	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	1. Baselined procedure guideline 2. Reflight procedures no longer require update unless requested by PI/PD	Baselined procedure guideline 2001 Reflight Procedures 2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
65.	Lack of customer involvement in process	The user community requests the ability to ease the development and update of payload and experiment unique software. This includes the ability to change software to accommodate experiment evolution, uplink changes easily, and a system/communication design that assures that experiment unique software cannot affect other experiment in the payload package. Ground testing of experiment software isolation should be sufficient to allow new software to be uploaded and run in a payload or experiment without concern to other experiments or systems on the ISS.	The ISS payloads office should host a user's workshop with the RPOs and end users to discuss the current approach and provide feedback to streamline and simplify the process	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Payload Software Control Panel currently hosts user workshops and receives feedback from software users.	2000
66.	Lack of customer involvement in process	No "real" users on board for the development process	During the development of the SSF, provide a continuum of payload expertise to accomplish resolution of user accommodation issues.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Established expertise to assist with accommodations in the ISS Payloads Office	1999

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
67.	Lack of customer involvement in process	Action without user consultation. Examples, include: Direction not to advocate requirements for users, procedures such as cancelled change requests, lack of trade studies for user requirements	Reestablish a user integration panel at level II to provide a working forum to address accommodations and trades	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Payload Control Board weighs all trades and reviews all CRs assessing any changes required to accommodations. The ISS Program Scientist has been established to ensure research requirements are reviewed within the Program. The RPWG is established as a forum to assess accommodations and trades within the ISS Program/ISS Payloads Office.	1998
68.	Lack of customer involvement in process	Action without user consultation. Examples, include: Direction not to advocate requirements for users, procedures such as cancelled change requests, lack of trade studies for user requirements	Add representatives or team leaders from the SSF payload experts (or Pls if appropriate) as control board members at level I/II/III	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Research Integration Office, OZ program office, Implementation centers are represented on the PCB	1998

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
69.	Lack of customer involvement in process	Action without user consultation. Examples, include: Direction not to advocate requirements for users, procedures such as cancelled change requests, lack of trade studies for user requirements	Form a continuous improvement team consisting of SSF program and user code personnel to evaluate the current configuration control board process at levels I, II, III to determine effectiveness of this process for the user	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	The ISS Payloads Office established PPMRs to improve process in 2000. Followed with focused six sigma process improvements in 2002. Established and implemented a customer service team and a post increment customer survey as well as a customer help line in 2003.	2000-ongoing

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
70.	Lack of customer involvement in process	Length, complexity, and costs of process discourages customers, insufficient flexibility within process, limited effective communication opportunities with users, differing priorities placed on different payload types, circumvention of established integration process. The payload integration process can be improved to be more equitable, more flexible, less burdensome, and less costly to customers. The customer interface positions in the integrating organizations are critical elements for customer satisfaction and integration efficiency.	Implement a customer survey process in each integration organization to measure customer satisfaction. Assure that the survey results are distributed among NASA programs & customer codes	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	ISS Payloads Office has established a post-increment survey and a customer service team to provide feedback and corrective action review based on post increment surveys and customer service help line feedback	Feb-03
71.	Lack of customer involvement in process	Customer Access to Space, customer expectations are greater than available flight opportunities, shuttle flight rate constraints and ISS assembly afford fewer secondary payload opportunities	NASA HQ to host a customer forum to present status, changes and improvements to customer access for flying payloads on the ISS, Shuttle, and ELV	Freedom to Manage	Dec-02	No	Due in March but Columbia incident has delayed implementation	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
72.	Lack of customer involvement in process	Customer insight into the SSP/ISS flight assignment process . Customers have no active role in the mission assignment process	Define the flight assignment process and points of contact on the websites.	Freedom to Manage	Dec-02	No	Due in March but Columbia incident has delayed implementation	
73.	Lack of customer involvement in process	The value of information gained from end-to-end testing, as demonstrated by its application to pressurized payloads is very high	The external payloads should be subjected to end-to-end testing to the greatest extent that is possible	Biological & Physical Research Advisory Committee (BPRAC)	2000	Yes	Recent end-to-end testing was successfully accomplished with the AMS payload and the S3 truss. This test validated the AMS interface and will be valuable in verifying the truss simulator that will be used for future payloads once the truss is on orbit.	Mar-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
74.	Lack of customer involvement in process	Investigators have no flexibility to alter their experimental plan from that originally proposed and approved. Considerable time may lapse between selection of the investigation and the assigned flight...new knowledge may become available which could improve the originally proposed plan...No provisions in the current system for accommodating this knowledge. As a result, sub optimal experiments may be flown	NASA (should) expedite the mechanism that would allow update or incorporation of changes to experimental plans within the scope of the original investigation, but without impacting the length of the flight authorization process	Biological & Physical Research Advisory Committee (BPRAC)	2000	Yes	Report Response Feb. '01: The current integration activities are fairly complex: as the program moves along, the activity should become more simplified and easier. The ISS Program has demonstrated flexibility in accommodating late changes and can work exceptions on a case-by-case basis; however, there will be certain hard "cut-off" dates (as close to launch as possible).	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
75.	Lack of customer involvement in process	Investigators on Increments 3 and 4, and members of the SSUAS have had difficulties with all stages of the flight approval process – including the recurrent flight justification and approval as well as the problem of having flight experiments that have been approved by peer review panels modified by the subsequent engineering reviews. In addition, many recounted episodes of colleagues whose experiments were approved for flight by peer review panels only to be delayed so many years or times that the original experiment was terminated or became superfluous. Finally, investigators brought forward instances in which seemingly arbitrary decisions were made about flight opportunities	The SSUAS recommends that more scientists be included in ISS management positions	Biological & Physical Research Advisory Committee (BPRAC)	2002	No		

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
76.	Lack of Flight Opportunities	There are 5 JEM-EF sites allocated to the US and the proposed PUP shows 4 of the 5 occupied by 2004. Upmass constraints limit the number of external payloads that can fly, Limited number of attach points for attached payloads with increasing list of potential space science investigations that require large area and long exposure	The payload office should continue to seek increased opportunities for attached payloads on the ISS	Space Station Utilization Advisory Subcommittee	Jun-99	In Work	Brazil stated in 2001 its intent to not meet the barter associated with EXPRESS Pallet design/development. ISS Program is currently looking into alternative ways for funding of the Pallet.	ESA attached sites available in October 2004. JEM EF available in 2007. Express Pallet in 2008.
77.	Lack of NASA Priority System	No cross disciplinary prioritization plan exists. This lack of cross-disciplinary prioritization exacerbates the uncertainty that undermines the confidence of the scientific community and their readiness to support the program	NASA should create a cross-disciplinary research prioritization plan with accompanying rationale, based on overall program goals for the ISS, that permits ranking and can be used to effectively manage the scientific program	NRC -Factors Affecting the Utilization of the International Space Station for Research in the Biological and Physical Sciences	1999/2000	Yes	Prioritization was done as part of REMAP and the follow up prioritization by the NASA Chief Scientist	
78.	Lack of NASA Priority System	No consensus in goals -- external and internal	Establish an agency wide consensus on the purpose of SSF. Create an agency-wide action team chaired at the highest level with all Associate Administrators as members and with external members such as Norm Augustine, Lou Lanzerotti, and Alan Bromley	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	NASA Strategic Plan/ REMAP	2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
79.	Lack of NASA Priority System	Customer insight into the SSP/ISS flight assignment process . Customers have no active role in the mission assignment process	HQ update current policies for SSP and ISS payload assignment process	Freedom to Manage	Dec-02	No	Due in March but Columbia incident has delayed implementation	
80.	Manifesting	NASA does not have an integrated manifesting approach to optimize NASA resource utilization	NASA establish a centralized payload steering committee for balancing U.S. research allocations on platforms across all disciplines, partners, and commercial entities. The steering committee would be comprised of representatives for all NASA research organizations and chaired by the NASA chief scientist	Payload Engineering Processing Study Phase A & B	Nov-97	No	Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	
81.	Manifesting	Absence of Agency-wide plan for continuing space research capabilities - I.e. Science & Technology Proposals, Spacelab/SSF Transition Pressurized module utilization, shuttle manifest	Establish Agency-wide plan for continuing space research capabilities which are consistent with SSF goals and are supported by the Shuttle Manifest	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	In Work	In 2002 REMAP and overall ISS requirements were established via the UOP, which includes all International Partners. These requirements have been reviewed against current ISS resources and Shuttle capabilities. These requirements can be met by 5 shuttle flights a year, provided the ISS crew is expanded to 6/7. Expansion to beyond a crew of 3 is under assessment through the MPPT.	2006

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
82.	Manifesting	No Finding	Consolidate Station and Shuttle long-range manifesting and scheduling elements into an integrated traffic planning function	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	At the Shuttle and ISS Center Program levels, research planning have been consolidated in the JRPWG. A fully consolidated planning function at the HQ level still needs to occur.	
83.	NASA Risk Philosophy	NASA has become stricter on the reliability requirements for the experiment hardware so that it is now a major cost driver. The emphasis on designing failure-proof hardware causes the devices to be built beyond a level of robustness that is needed to collect the scientific data	NASA must review the requirements being imposed on the PD, and allow the determination of the level of reliability and quality requirements to shift to be the responsibility of the funding organization	Payload Engineering Processing Study Phase A & B	Nov-97	No	Still an issue and in charter for SSUR Team. Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
84.	NASA Risk Philosophy	Responsibility for mission success and payload success are not clearly and separately defined for customers and integrators. This is a major driver for verification, safety, and integration requirements and implementation. Not all customers are treated equally or fairly across the agency. There is no uniformity between field centers on standards/requirements that are levied on customers.	The Agency must define the NASA program and customer responsibilities for mission success and payload success in the form of a NASA Management Instruction (NMI) or appropriate policy directive.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	Recommendations were turned over to SSF Program for implementation. The Program was on the team but didn't have time to support so didn't have buy in to recommendations. Dr. Lenoir, the AA advocate for the study left NASA.	
85.	NASA Risk Philosophy	Invoking the Program Requirements on Payloads (PRP) document is too stringent, and not cost effective	The PRP is more suited as a guide that a NASA manager in the appropriate RPO could use to manage risk in selecting requirements consistent with the complexity of the payload and the experience of the PD	POCAAS	Feb-02	In Work	PRP is no longer a requirement by the ISS Payloads Office. It is being assessed at the HQ level.	2003

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
86.	NASA Risk Philosophy	ISS Program Requirements for Payloads as presently written is a cost impact to all existing hardware and will seriously impact the way costing of future hardware is accomplished. Examples, menagerie of new planning documents, a stringent Mil-Std approach to parts selection, complex and costly reliability analyses, etc. that many limit ISS payload development to major aerospace companies	The PRP is more suited as a guide that a NASA manager in the appropriate RPO could use to manage risk in selecting requirements consistent with the complexity of the payload and the experience of the PD	POCAAS	Feb-02	In Work	PRP is no longer a requirement by the ISS Payloads Office. It is being assessed at the HQ level.	2003

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
87.	NGO	NGO	The NGO should have an in-house cadre of support scientists and engineers who serve as points of contact for an investigator in dealing with the NGO and other implementing ISS organizations both within and external to the government. The members of this cadre should act as facilitators for investigators who are new to the complex world of using the ISS as well as for investigators who are more experienced. They should represent the interests of the investigators throughout the process of interface definition, payload development, testing and documentation, flight planning and operations, and post flight processing of results.	NRC - Ping Study	1999/2000	No	See Utilization Concept Development Study	2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
88.	On Orbit Operations	NASA currently has 20 hours of crew time per week identified for science-related activities. Of this, the United States will be allotted only 7.5 hours, which is not sufficient to take advantage of even the reduced scientific capabilities of the Core complete ISS. Unplanned events, such as in-in-flight equipment repairs, even if they require a small amount of time (e.g. 30 minutes) can result in large reductions in scientific activities performed if they are taken out of the science utilization time.	NASA should evaluate the adequacy of the time allotted to perform the science that is scheduled for the ISS, taking into account interdisciplinary priorities and the equipment and facilities that are available. In order to maximize the research on ISS, it is essential that there be coordination of the research, so that crew from one country can and will be able to conduct experiments in the modules of other countries, and that PI's from the US will be able to have access to facilities from other countries. Increased collaboration with international partners to share facilities and crew time could enable research that the US community cannot accomplish alone.	NRC -Factors Affecting the Utilization of the International Space Station for Research in the Biological and Physical Sciences	1999/2000	Yes	The UOP developed international requirements on the ISS and has presented these requirements to external advisory committees such as the BPRAC, NAC and SSUAS. ISLSWG and IMSPG are established as forums for cooperative interaction and agreements associated with facilities on orbit and international use of those facilities.	2002
89.	On Orbit Operations	ISS operations today are being largely conducted in "sortie" mode; an alternative concept for long-term payload operations is "continuous flow"	Adopt continuous flow processes where possible to reduce repetitious increment-based activities.	POCAAS	Feb-02	In Work	ISS Payloads Office has greatly improved the process and has forward actions under way to further improve.	Dec-03

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
90.	Organization Issues	No Finding	Consolidate Station Program planning functions into an integrated program planning function . Includes Station Strategic and Tactical Planning, and Station Common Operations Cost function	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	At the Shuttle and ISS Center Program levels, research planning have been consolidated in the JRPWG. A fully consolidated planning function at the HQ level still needs to occur.	
91.	Organization Issues	No Finding	Develop a top-level concept for a consolidated Shuttle and Station Program.	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	Currently no Agency level plan to consolidate the two Programs.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
92.	Organization Issues	No Finding	Consolidate all program (Station and Shuttle) and implementation functions (organizations, processes, and facilities/tools) associated with Cargo/Payload Integration and preflight testing	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	A Joint Payload Integration Working Group, of representatives from the JSC Shuttle and Station Programs, performed a study. Decision was to not proceed with combining offices or documentation at that time since ISS documentation was still evolving. The team determined shuttle documentation was focused on either a large payload in the payload bay (an MPLM) and ISS focused on experiments within MPLM. The overlap occurred for middeck payloads. Middeck documentation has been incorporated into the ISS documentation (Express Rack IDD) to avoid sending the PD to multiple interfaces and documentation. ISS users only have to interface with the ISS Payloads Office. Both ISS Payloads & Shuttle Integration have combined processes such as manifesting. Safety processes are same for both Programs.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
93.	Organizational Issues	Impediments to earth science utilization. Uncertainties appear to exist in the areas of : payload interface definition, payload interface equipment, modeling of natural and induced environments, utilization of flight opportunities, strategic and tactical planning, payload requirements, and the overall payload integration process for earth sciences. The availability of a clear focal point in the earth science program for day to day integration also appears uncertain	The OES should appoint a representative to work the day-to-day technical, cost, schedule, and other implementation issues with the ISS Payloads Office	Space Station Utilization Advisory Subcommittee	Feb-99	No	A Code S/Y RPO is established and a member of the RPWG. No funding is currently in place for Code Y payloads on ISS.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
94.	Organizational Issues	ISS Utilization management from concept to flight results reporting needs to be ISS focused. No single Utilization organization is managing the overall research development, prioritization, hardware development and testing, mission integration, operations, and communication of results to the public	A top to bottom Utilization Management and Implementation architecture be developed within NASA and the ISS program to focus, organize, and streamline Utilization on the ISS.	ISS Operations Architecture Study - Cox	1999/2000	No	Reviewed as part of Utilization Management Study.	2002
95.	Organizational Issues	The utilization community is detached from the ISSPO. Even though the HEDS organization has a common set of goals, the research community is detached from the larger processes and decisions that control destiny on the ISS program	Structure utilization management as part of the total program. Bring the utilization community's goal setting, budgeting/funding allocation, and decision making processes together, under the same organizational umbrella from NASA HQ to the ISSPO and the NASA field-center level.	ISS Operations Architecture Study - Cox	1999/2000	No	Not fully endorsed as a priority by NASA. Would require complete reorganization to position the ISS Program under OBPR.	
96.	Organizational Issues	NGO	Provide the research community with a user friendly single point of contact through which it can access the capabilities of the ISS	NRC - Ping Study	1999/2000	No	Not established within the NGO, but has been established in the ISS Payloads Office	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
97.	Organizational Issues	The missions with multiple mission management organizations, multiple IPTs, and multiple control boards cause unnecessary work and consume additional resources	A central organization such as NASA, SPACEHAB, or a similar entity needs to perform the entire payload Mission Management role and serve as the point of contact with Shuttle Program Office managers, ISS, the safety panels, etc.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Single interface has been established through the PIM. Mission Management function is established in the ISS Payloads Office. Individual Payloads do not interface directly to the Shuttle organization.	2000
98.	Organizational Issues	The points of contact for a user as exemplified by the Mission Manager in the Spacelab Program and the Payload Integration Manger in the Space Shuttle Program is planned to be implemented differently for ISS payloads. The ISS payloads office provides for a portion of this interface with ISS payload PIM, but delegates the remainder of the Mission Manger function to other organizational elements in the ISS payload office. This delegation puts more responsibility on the user which many result in more costs to the users	Work the points of contact functions to better define the roles of the PIM and PMI with emphasis that these roles should assist the user in streamlining the process to flight. Incorporate better definitions of these functions in the payload users guide	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Mission Manager is established in the ISS as the Increment Payload Manager. PIM service standards have been established by the ISS Payloads Office and are currently being implemented which address points of contact, and services to be provided by the ISS.	February 2003

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
99.	Organizational Issues	There is a large number of ISS configuration management panels and boards. To the uninitiated, it is complex and confusing, as well as burdensome and expensive for the user to support	Define and minimize the number of boards and panels the users are required to interface with. Document these boards and panels and their inter-relationships to the user in the ISS Payload Users guide	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Boards and panels a Payload Developer must interface with have been minimized. All interfaces are identified on the ISS Payloads Office CD Information Source and Web Site. The PIM is the primary interface to boards and will alert the PD of specific changes through the PIM web page.	October 2002
100.	Organizational Issues	The Payload Operations Control Board (POCB) Chair is represented indirectly on the PCB via the MSFC Project Office	The POCB Chair should be a member of the PCB and a mandatory evaluator for the PCB items.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	POCB chairperson serves on the PCB	2000
101.	Organizational Issues	The ISS program doesn't have a Mission or Increment Scientist to set priorities and consolidate customer requirements	Define and establish the Increment Scientist, the increment science roles and responsibilities and staffing requirements. This function (as well as identification of Increment Managers) should be added to the ISS program ASAP.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Lead Increment Scientist is established. Increment Scientists are established for each discipline.	2000

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
102.	Organizational Issues	No Coordination between codes and SSF Program	Communicate these goals and plans across the Agency and user community at all levels	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	In 2002 REMAP and overall ISS requirements were established. These requirements can be met by 5 shuttle flights a year, provided the ISS crew is expanded to 6/7. These requirements have been presented to Congress and users through SSUAS, NAC, and BPRAC presentations.	2002/2003
103.	Organizational Issues	Negative Management attitude at highest levels with respect to responsiveness to users	Communicate user advocacy and responsiveness as a priority	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	User advocacy and responsive is a priority in NASA as demonstrated by all efforts associated with Utilization Concept Development Team and in the ISS Payloads Office process improvements efforts. Systematic Customer Feedback process has been established to ensure advocacy and responsiveness is continued.	2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
104.	Organizational Issues	Insufficient incentive for SSF response to users	User advocacy and responsiveness should be included as part of SSF upper management performance plans	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	Recommendations were turned over to SSF Program for implementation. The Program was on the team but didn't have time to support so didn't have buy in to recommendations. Dr. Lenoir, the AA advocate for the study left NASA.	
105.	Organizational Issues	Unclear roles/responsibilities for util/ops at levels I/II/III and across codes	Clearly define the SSF util/ops roles and responsibilities for a cohesive and responsive organizational structure with minimal overlap and clear interfaces for the users	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No		

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
106.	Organizational Issues	Length, complexity, and costs of process discourages customers, insufficient flexibility within process, limited effective communication opportunities with users, differing priorities placed on different payload types, circumvention of established integration process. The payload integration process can be improved to be more equitable, more flexible, less burdensome, and less costly to customers. The customer interface positions in the integrating organizations are critical elements for customer satisfaction and integration efficiency.	The customer interface position and support to it must be defined in terms of a customer facilitator. This position must be filled by appropriate civil service personnel and must be viewed as the primary link to the customer with attendant travel budget to allow this function to be accomplished	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No		
107.	Organizational Issues	There are overlaps and some conflicts between crew training teams at MSFC and JSC	Pick one center to do the job. Crew training clearly should be performed at JSC because they are most experienced	POCAAS	Feb-02	Yes	MSFC responsible for management of crew training but performed at JSC. JSC standalone org was deleted.	2002
108.	Organizational Issues	Multiple inputs of same data into different systems PDL, iURC, OPMS, PIMS	Agree to have a primary NASA and/or NASA contractor Point of Contact for all inputs to ease the burden on the PI/PD	POCAAS	Feb-02	Yes	PIM service standards were established by the ISS Payloads Office and are currently being implemented.	Feb-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
109.	Organizational Issues	The ISS payload program has far too many different organizations each with its own support staff. It is all but impossible for a small PI/PD team to effectively interface with an organization of this size.	Ideally, the Research Program Office should be solely responsible as the interface between the PD and ISS, or the RPO should delegate all technical authority to the PD for working directly with ISS EXPRESS, etc.	POCAAS	Feb-02	Yes	The Facility Developer/Integrator is the primary interface for the individual payload developer. If an EXPRESS payload, EXPRESS is the primary interface for integration. This issue was a concern associated with MRPO role, which is now phased out.	Dec-02
110.	Organizational Issues	No Finding	Examine and eliminate inefficiencies between the project offices and the contracting offices	Microgravity Research Program Study, 1999	1999	Yes	Worked on a case-by-case basis between Centers and their contracts.	2000
111.	Organizational Issues	No Finding	Give more attention to the selection and assignment of NASA project managers through consideration of the project's size, complexity, visibility, science criticality, and budget, as well as the credentials of the PI or developer.	Microgravity Research Program Study, 1999	1999	Yes	Currently this assessment and assignment is performed at Center Project level.	2000
112.	Organizational Issues	No Finding	Examine the management structure and the interface with the PI/developer to eliminate duplicate, and sometimes contradictory, direction from multiple levels of NASA management.	Microgravity Research Program Study, 1999	1999	No		

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
113.	Organizational Issues	No Finding	Examine management policies whereby managers are changed for purposes such as training.	Microgravity Research Program Study, 1999	1999	No		
114.	Organizational Issues/One NASA	Responsibility for mission success and payload success are not clearly and separately defined for customers and integrators. This is a major driver for verification, safety, and integration requirements and implementation. Not all customers are treated equally or fairly across the agency. There is no uniformity between field centers on standards/requirements that are levied on customers.	Reciprocity between the NASA field centers must be established in the major engineering disciplines for standards/requirements that are levied on the customers. HQ should coordinate this effort.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	Recommendations were turned over to SSF Program for implementation. The Program was on the team but didn't have time to support so didn't have buy in to recommendations. Dr. Lenoir, the AA advocate for the study left NASA.	
115.	Organizational Issues/One NASA	Multiple customer paths of entry into NASA	Create a central website location for customers to access information concerning the details of flying on the ISS, Shuttle, and ELV	Freedom to Manage	Dec-02	No	Currently a forward action for the Freedom to Manage Team	
116.	Organizational Issues/One NASA	Multiple customer paths of entry into NASA	Take the best practices of the customer feedback processes of the ISS, Shuttle, and ELV programs and standardize the process across all three programs	Freedom to Manage	Dec-02	No	Due in March but Columbia incident has delayed implementation	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
117.	Organizational Issues/One NASA	Commercial space development activities are increasing. These activities occur in many parts of ...NASA...and lack central policy guidance and coordination. Moreover, individual PI's increasingly seeking to establish business relationships with private sector investors with uniform guidance from NASA on appropriate legal matters such as patents, licensing, trademarks, and procurement	The NASA Administrator should address the status of commercial programs and develop standard policies and coordinate them. The assistant to the administrator for Commercial Development should have designated staff co-located in field centers and HQ offices to facilitate communication and cooperation in all endeavors.	Biological & Physical Research Advisory Committee (BPRAC)	2002	No		

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
118.	Organizational Issues/One NASA	investigators who flew on ISS Increments 3 and 4 indicated difficulties in contacting the POIC, reworking problems that occurred unexpectedly that affect the timeline, and gaining access to appropriate managers of protocols and processes. These difficulties in translating protocols and procedures from one Center to another cause needless increases in cost, loss of efficiency in ...ISS utilization, and reduced science return	The SSUAS recommends that the Administrator and the AA for OBPR actively reduce inter-Center completion to promote cost and performance efficiencies in ISS utilization	Biological & Physical Research Advisory Committee (BPRAC)	2002	Yes	Issues have been resolved with concerns with communication to the ISS crew from the Telescience Center through the POIC . The Telescience Center has updated their policy to allow this communication.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
119.	Other	Crew research time is a precious commodity. Utilization time aboard the ISS is a precious commodity. The crew time and the microgravity level are the primary reasons that researchers in access to the ISS. Without the "people," the research work could be relegated to satellites. Efforts to increase the available crew time and/or improve the overall efficiency of crew and ground operations could increase the benefit of research operations on the ISS.	Increase the number of available crew hours devoted to research. This effort should target 70% as that desired for research with a seven-person crew. To increase the effectiveness of in-flight research, NASA should use Mission specialists or science astronauts to work in the SSURI as participants at all levels of the organization. To optimize increment-specific research, crew flight assignments consider crew selection recommendation from the SSURI to take advantage of specific crew talents and training to meet flight research requirements.	ISS Operations Architecture Study - Cox	1999/2000	Yes	Crew are now assigned as Science Officers on the ISS	2002
120.	Other	NGO	NASA should consider adopting the Spacelab payload specialist model for the ISS. In this model, research crew members selected by the research community, in adherence to rigorous procedures, have primary responsibility for the support of on orbit research operations. The NGO should be responsible for the recruitment, selection, and flight assignments of the ISS payload specialists.	NRC - Ping Study	1999/2000	No	ISS Science Officer was established	2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
121.	Other	Impediments to earth science utilization. Uncertainties appear to exist in the areas of : payload interface definition, payload interface equipment, modeling of natural and induced environments, utilization of flight opportunities, strategic and tactical planning, payload requirements, and the overall payload integration process for earth sciences. The availability of a clear focal point in the earth science program for day to day integration also appears uncertain	As a step towards overall improved communications, the SSUAS recommendations inviting all NASA science code AA's to present their plans for ISS utilization to the SSUAS at our next upcoming summer study. These presentations should include discussion of any issues with respect to utilization as perceived by the science AA's	Space Station Utilization Advisory Subcommittee	Feb-99	No		
122.	Other	The MOU between the US and Russia cites that there are no Russian provided element user accommodations or utilization resources set aside for US sponsored research.	The ISS program office to initiate discussions with RSA for provision of user accommodations and utilization resources in the Russian element. In addition, should the NASA/RSA Balance of contributions negotiation be reopened, the need for these RSA provided capabilities should be considered in the development of a NASA negotiating position	Payload Engineering Processing Study Phase A & B	Nov-97	No	The ISS Payloads Office has processes in place to accommodate use of Russian resources when required, in particular upmass on Russian Vehicles. These negotiations work effectively through ISS Payloads Team 0.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
123.	Other	The ISS program has not established an internal process to integrate US research hardware on Russian elements or launch vehicles. Phase I lessons learned have indicated this flexibility is required to efficiently implement a cooperative, timely, program	ISS program office to establish and document the processes and templates for implementing the necessary arrangements for US payloads that will be conducted utilizing the Russian elements, crew and launch vehicles	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	The ISS Payloads Office has processes in place to accommodate use of Russian resources when required, in particular upmass on Russian Vehicles. These negotiations work effectively through ISS Payloads Team 0.	Jan-00
124.	Other	No Finding	Eliminate all Station and Shuttle nonstandard cargo engineering services	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No	In general standard services are utilized. However, where possible unique payload requirements are accommodated.	
125.	Other	No Finding	Upgrade the current suitcase test environment for payload to the payload rack checkout unit level, thereby providing a higher level of interface testing for the user during the payload development cycle. U.S International Payload Rack Checkout Unit capability should be correspondingly adjusted to focus on the test capability needed at the launch site	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	All suitcase simulators and PRCUs have completed development and are delivered.	2002

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
126.	Program Advocacy	No consensus in goals -- external and internal	Communicate this consensus to the customer--- administration, congress, research community, public	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	NASA Strategic Plan/ REMAP. Presented to outside community, Congress & Advisory Communities, OMB	2002
127.	Program Advocacy	No consensus in goals -- external and internal	The SSF Program should periodically coordinate with user codes (at least twice a year) to assure that plans, budgets, and program status is consistent with implementation of the approved goals for SSF.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Code U has reviews, strategic planning meetings, SSUB, SSUAS where ISS Payloads office is present and key player. ISS Research plans are reviewed twice a year by the SSUAS/BPRAC.	2002
128.	Program Advocacy	Lack of realistic mechanism to become active participant/advocate in SSF	Establish the Space Station Utilization advisory subcommittee (SSUAS) to enhance the user input to the SSF Program levels I & II	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	SSUAS established	1996
129.	Program Advocacy	Lack of endorsement by NRC and weak endorsement by NSC. Infrequent communication between SSF Program & NRC	Periodically, the NASA and SSF top management should communicate, informally and in a on-on-one setting with the NRC and NSC.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	NASA consults periodically with the NAC and NRC and biannually with SSUAS and BPRAC	1996

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
130.	Program Advocacy	Lack of endorsement by NRC and weak endorsement by NSC. Infrequent communication between SSF Program & NRC	Use the SSUAS to provide status reports to the NRC and use the SSF Payload Experts to provide technical presentations at research symposia. Invite feedback from these forums	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	NASA consults periodically with the NAC and NRC and biannually with SSUAS and BPRAC	1996
131.	Program Advocacy	Research and experiment success not emphasized or properly prioritized within the ISS program	Mandate a new program directive to support science or give science an advocate within the program at the highest levels	POCAAS	Feb-02	Yes	ISS Program Scientist established	Apr-02
132.	Proposals & AO	Impediments to earth science utilization. Uncertainties appear to exist in the areas of : payload interface definition, payload interface equipment, modeling of natural and induced environments, utilization of flight opportunities, strategic and tactical planning, payload requirements, and the overall payload integration process for earth sciences. The availability of a clear focal point in the earth science program for day to day integration also appears uncertain	The office of Earth Sciences (OES) that forms the foundation for use of ISS accommodations and resources should develop guidelines. These guidelines should include specific direction on which OES solicitation process (AO and/or NRA) should be used to solicit external attached and internal WOLF payloads	Space Station Utilization Advisory Subcommittee	Feb-99	No	Code Y is not currently developing ISS Earth Sciences AO solicitations.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
133.	requirements	Experiments are selected but not manifested or cannot meet the target manifest	Limit the growth of science requirements through the A/B phases of a project	Payload Engineering Processing Study Phase A & B	Nov-97	No	Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	
134.	Requirements	NASA is developing payloads, facilities, and carriers in parallel	"Design-to" requirements need to be baselined and distributed to the users as soon as possible	Payload Engineering Processing Study Phase A & B	Nov-97	No	Part is OBE since Lab is on orbit now and interfaces for partner labs are baselined. Still have outstanding issue with EXPRESS Pallet/JEM EF. Interface requirements are in work for FRAM to provide to JEM EF payloads.	
135.	Requirements	The support and interface requirements for the Payload Investigators or new users are not clear to the user communities.	The ISS program should develop a Payload Users guide, tailored for the various types of payload customers (rack, middeck, and attached), that specifically identifies all the roles and responsibilities of the ISS program and the users. Include: research management plan, configuration management guide, operation and integration schedules and defined documented process to assure users have the complete, concise, information required for the successful implementation of an ISS research program	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	The ISS Payloads Office developed an information Source CD and website that acts as users guide to Station Utilization.	October 2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
136.	requirements	The support and interface requirements for the Payload Investigators or new users are not clear to the user communities.	Review the RPO/user processes to assure a common strategy for research/experiment development and to identify potential areas of streamlining and coordination that may reduce cost and increase efficiencies in payload development for ISS. Document the RPO/user processes in an RPO specific user guide and compare across RPOs to assure consistency where appropriate and understanding of rationale where RPO processes differ	Payload Engineering Processing Study Phase A & B	Nov-97	No	Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	
137.	Requirements	The ISS program policy that payloads must use the EXPRESS laptop computer will not accommodate all users. This will restrict flexibility and increase software development and future maintenance and update costs.	While a single laptop may accommodate many users, the one size fits all approach should be relaxed to allow experiment specific computers when specific or complex requirements exist	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Special requirements are considered and worked through the Payload Software Control Panel	2000

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
138.	Requirements	The experiments will need additional flexibility to make full use of ISS opportunities in the area of displays for experiment control, tracking experiment operation by crews, and crew training	Utilization of web browsers to look at HTML based displays should be considered. The users and the crew would have a familiar, powerful tool for getting information and displays that could be used to look at essentially all types of ISS information. The ISS payloads office could provide a uniform look and feel with templates for the pages while the user could supply content.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Display standards are baselined. Other specialized requirements for displays can be assessed and accommodated through the Payloads Software Control Panel.	2000
139.	Requirements	The current ISS training classification system does not adequately address payload complexity and requirement differences within the four identified classifications.	Expand the payload classification system within the payload training implementation plan to address complexity differences within the current classifications. Training requirements and equipment fidelity should be documented sufficiently to address all payloads. Criteria should include experiment complexity, ISS resources and crew time requirements	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Payload classification has been implemented and is considered in Training Strategy Teams	2002

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
140.	Requirements	Lessons learned from Phase I program identify a need to plan late changes prior to flight. The ISS payloads office has not established the processes for managing late user payload implementation, i.e. changes due to launch slips, assembly changes, manifest changes, close-to-mission crew change out, etc.	Establish and document the processes for implementing user payload requirements in off nominal conditions	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Process is established for late changes. They are accommodated through the Payload Mission Integration Team chaired by the Increment Payload manager.	2000
141.	Requirements	Responsibility for mission success and payload success are not clearly and separately defined for customers and integrators. This is a major driver for verification, safety, and integration requirements and implementation. Not all customers are treated equally or fairly across the agency. There is no uniformity between field centers on standards/requirements which are levied on customers.	The OSF should review and either change or provide rationale for differences between requirements levied on payloads and the carrier hardware.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	Recommendations were turned over to SSF Program for implementation. The Program was on the team but didn't have time to support so didn't have buy in to recommendations. Dr. Lenoir, the AA advocate for the study left NASA.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
142.	Requirements	The customer community has identified verification as an area of significant cost. The distinction between interface verification and safety verification is not well understood	After the NASA policy on responsibility for mission success has been established, charter a Process Action Team to evaluate the verification requirements and assure compatibility between the NASA policy on responsibilities and these requirements. This PAT should also consider whether these verification requirements can be integrated across all NASA programs	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	No	Recommendations were turned over to SSF Program for implementation. The Program was on the team but didn't have time to support so didn't have buy in to recommendations. Dr. Lenoir, the AA advocate for the study left NASA.	
143.	Requirements	Too many requirements have no value. Most PD teams know what requirements have little or no value and are ultimately ignored after a great deal of manpower has been expended trying to meet and verify requirements.	Conduct a requirements review with the Program, RPOs, and PDs to get these requirements out of program. Examples include secularity, acoustics,	POCAAS	Feb-02	No		
144.	Requirements	Express rack verification data deliverable are not tailored to the EXPRESS Rack Interface Definition Document in which payload interface control is documented.	Shuttle & SpaceHab all require verification data submittals based on ICD requirement number and no discipline numbering systems. Express Rack should do the same	POCAAS	Feb-02	No	Followed Spacelab model and have generic numbering	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
145.	Requirements	Payload color front plate requirement	Eliminate this requirement for existing Shuttle payloads that will fly on ISS. Lets get some common sense back into space experiments. No one should care what color the payload or the front panel is so long as it passes all of the required tests, and the massive amount of integration paper work is provided, and has approval from the JSC safety board to fly.	POCAAS	Feb-02	Yes	A Human Factors Integration Team was initiated to help developers through verification of labels and human factors requirements. This integrated team will submit human factors verification reports for payloads developers.	Feb-03
146.	Requirements	Acoustics Verification	The acoustics limits are too low, probably unrealistic. There seems to be more background noise on ISS than payload related noise. Modify payload acoustics limits (raise them) using ex-payload specialists as a sanity check to obtain a realistic value rather than an artificial number. If astronauts would wear earplugs (with microphones in them) or headphones, we could substantially relax the acoustics requirement and save a tremendous amount of money and time for every payload being developed for ISS.	POCAAS	Feb-02	No	Acoustics requirements are not being relaxed. There are serious concerns on orbit for the crew associated with acoustics.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
147.	Requirements	Toggle switch angular throw requirement	Eliminate the formal requirement, modify it to be a guideline, and use crew approval in training on the hardware to meet the guideline. Put common sense consistent with safety requirements back into conducting space flight experiments	POCAAS	Feb-02	In Work	In review as part of verification scrub. This is helped by establishment of a Human Factors Integration Team	Jun-03
148.	Requirements	A drawing will be generated for every item on board ISS. PI/PD were required to provide an engineering drawing of a standard videotape cassette.	Revisit this requirement and eliminate those items that don't make sense and waster time and money. Perhaps take digital photos of these type things rather than a drawing signed off by engineers.	POCAAS	Feb-02	In Work	In review as part of verification scrub. This is helped by establishment of a Human Factors Integration Team	Jun-03
149.	Requirements	Several groups ask for drawings when many times drawings are already in PDL. Too many people are touching drawings, no clear actively used process, procedure people look at wrong procedures because of unclear process, PDs do not know where to input data, procedure input process starts too early , etc.	Review with PI/PDs to eliminate the onerous drawing requirements	POCAAS	Feb-02	In Work	In review as part of the action to review PDL requirements	Dec-03

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
150.	Requirements	Research and experiment success not emphasized or properly prioritized with the ISS program. Level of effort required by PD teams to review and comment to PIRNs, CRs, facility documentation, unbaselined documents, coordination copies, draft issues, initial release, and white papers is excessive. Yet the ISS and or facility program have mandated no technical support to payload developers in experiment design/development.	Minimize requirement changes. Go through an intense requirements review process to revise only what really needs to be changed. Stop the new CR/PIRNs daily changes out every other day business. Deal with individual situations as they occur, keep a running list and then update the documents every year. Only process real value-added requirements	POCAAS	Feb-02	In Work	Currently being addressed as part of forward actions in ISS Payloads Office Process Improvements	Jun-03
151.	Requirements	No Finding	Reduce level of detail in program planning documents. The consolidated operations and utilization plan contains accommodations and resources allocated at Partner Level; Specific payload complements will not be identified. Partners define specific content, including payload content at I-12 months	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	Top-level manifest for all partners is baselined in the Payload Tactical Plan at I-16. Detailed (part by part) manifest is baselined with L-12.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
152.	Requirements	No Finding	Force all Station and Shuttle customers to meet core Interface Control Document requirements (standard interfaces and performance/resource envelopes) by assembly complete time frame	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	Station and Shuttle payloads meet standard interfaces today	
153.	Requirements	No Finding	Develop locker/tray, rack, logistic carrier, transportation system, and Station performance/resource envelopes. Eliminate all analytical analysis on Shuttle Station flights and Station, except that required to satisfy integrated safety and performance requirements by assembly complete time frame	Utilization, Operations, and Training assessment Team (UOTAT)	1995	No		
154.	Requirements	No Finding	Eliminate all configuration control drawings that are not needed for cargo/payload item installation, special packaging, or crew identification, by assembly complete time frame	Utilization, Operations, and Training assessment Team (UOTAT)	1995	In Work	All configuration documentation is currently under review as part of ISS Payload Office Process Improvement forward actions.	2003
155.	Requirements	No Finding	Eliminate orbiter pre-mate interface testing and cargo integration test equipment testing for mini-pressurized logistics module/unpressurized logistics carrier after first operational flight of each carrier	Utilization, Operations, and Training assessment Team (UOTAT)	1995	Yes	A CITE test is only performed on MPLM when configuration changes; specifically when go from a passive to active MPLM.	1999

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
156.	Requirements	No Finding	Develop material that clearly describes the purpose and requirements for all project documentation. Also, consider documenting appropriate "lessons learned" for new PI's	Microgravity Research Program Study, 1999	1999	Yes	All projects documents lessons learned. Project document is project specific. Level I requirements for projects are documented and streamlined. Program Executives are being instituted in Code U to put in place standard sized project management approach.	2002/2003
157.	Resources	In some cases the NASA technical support to the PDR's and CDR's has deteriorated to the point where the value added is questionable	The PD and PI organizations accept the increased risk	Payload Engineering Processing Study Phase A & B	Nov-97	No	No longer an issue because core team attends PDRs/CDRs	
158.	Resources	In some cases the NASA technical support to the PDR's and CDR's has deteriorated to the point where the value added is questionable	Perform the reviews with a core team of technical specialists to provide quality to the reviews.	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	Corrective action has been implemented; core team attends PDRs/CDRs	2000

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
159.	Resources	Low and unstable funding for SSF payloads and no "real" users on board for the development process	Immediately identify and fund authoritative and knowledgeable experts for each SSF payload in the existing SSF traffic models and establish technical user working groups (TUWGs) between the experts and the SSF implementers (level III) at the NASA centers. The role of these SSF payload experts is to address and help resolve detailed user/provider issues. These SSF experts might be facility scientists, payload project managers, PI's , etc. If these SSF experts are not already funded by one of the user codes, then they should be funded by the SSF Program	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Realistic budgets and funding have been put in place in Code U aligned with current development. Basis of Estimates with EACs were established for each project. Reserves were established at 20% to ensure success.	2002/2003
160.	Resources	Low and unstable funding for SSF payloads	Assure that funding is included in the appropriate budgets after the initiation of the Payload selection process for continued and steady payload development funding.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Realistic budgets and funding have been put in place in Code U aligned with current development. Basis of Estimates with EACs were established for each project. Reserves were established at 20% to ensure success.	2002/2003
161.	Resources	Reduce Payload Operations Integration Function (POIF) costs	Team recommended 4 cost options. See page E-6 or Executive Summary.	POCAAS	Feb-02	Yes	Cost reductions accomplished in POP -02	Jun-02

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
162.	Resources	Reduce cost of Payload Operations Integration Center	Reengineer the POIC to reduce cost. Make a \$6Million investment over the FY2002 - 2004 time period above FY 2002 budget guidelines, and reduce the operating budget in the FY 2005-2011, achieving a reduction of \$36 million from the FY 02 budget level over the 10 year period. The basis of the recommendation was technology refresh, consolidation of servers, with leasing of server options, transition from workstations to PC, increased automation of configuration and reconfiguration control	POCAAS	Feb-02	In Work	Approved POIC Reengineering 2002. Implementation complete by December 2004	Dec-04
163.	Resources	NISN costs and increasing budget trends are counter to current commercial costs and trends	Pursue alternative means of providing communications services at lower costs. Defer the requirement for distribution of ISS onboard video to the TSCs and RPIs , Defer the requirement for an increase in the current 50MB/sec KuBand communication rate until a justified payload requirement is defined	POCAAS	Feb-02	In Work	An innovative concept (IDEA) was developed to take ground to 150MB with minimal upfront cost and savings in out years. 150MB rate will be achieved in December 04.	Dec-04

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
164.	Resources	Lack of coordination of teams regarding PTCS/FCU testing.	Provide the direction and funding to bring remote payload testing in sync with the KSC PTCS schedules	POCAAS	Feb-02	No	KSC has the capability to provide a test between the PD remote site and KSC while hardware is being checked out in PTCS. If there is a requirement to test early, Payload Developers could submit this requirement to the PSCP requesting an earlier drop of the EHS database to support such a test. The Payload Developer would be required to submit C&DH data earlier to support an early drop of EHS.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
165.	Resources	At MSFC there are various configurations of machines, which make up requirements to perform testing or support a simulation or COFR or flight	Properly fund MSFC to configure the systems at MSFC to support the activities for flight and pre-flight. If not, distribute the documented availability of EHS versions for flights and which capabilities they will include. Also, if it is determined that some of these capabilities will not meet the documented ES versions, then immediately distribute these shortfalls to the PDs.	POCAAS	Feb-02	No	An assessment was recently performed on expanding POIC capability to interface with remote sites for early checkout of command/telemetry databases. Risk assessment determined there was low risk associated with being able to correct the database if a problem is found at KSC as compared to costs of early checkout implementation. If a PD has specific concerns, these can be addressed at the PSCP on a case by case basis.	
166.	Resources	ISSPO has developed a very useful tool to quantify and minimize the effect of limited resources on research. Presently, the two most limiting resources are Upmass capacity and Moderate Temperature Loop coolant capability	Upmass and coolant flow should be increased to balance resources availability and augment research capability	Space Station Utilization Advisory Subcommittee	Feb-00	In Work	The ISS Program has developed a tool to assess limiting resources to aide in decision making on maximizing overall research resources. Current limiting resource is upmass	2000

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
167.	Resources	Recent NRC reports have stressed the need for NASA to broaden its contact with the external research community. Increasing participation from the research communities through NASA funded programs is important for the ISS	NASA should improve it's grants management services in (a) stability and magnitude of funding, (b) firm commitment to timelines for funding and activation of grants, (c) improving its relationship with academic and commercial grants management offices	Space Station Utilization Advisory Subcommittee	Jul-00	No	Budget decision.	
168.	Resources	No Finding	Maintain funding authority with Code U through RDR rather than SCR	Microgravity Research Program Study, 1999	1999	Yes	All ISS research budget moved to Code U, so no longer an issue	2002
169.	Resources	Based on requirements provided to the payloads office crew training requirements exceed that available by more than a factor of three at assembly complete. Requirements appear to be a limiting resource for research operations. Efficient crew training is critical for optimization of research	The ISS payloads office should work with other elements of the ISS Program and payload developers and investigators to better understand and define realistic and detailed requirements for crew training. Roles and participation of Russian crewmembers should be addressed.	Biological & Physical Research Advisory Committee (BPRAC)	2000	Yes	ISS Program approved fenced crew training time for research of 400 hours. Training time is no longer the most constraining resource.	2001

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
170.	Resources	The Committee noted a number of issues that are negatively affecting PI morale including low selection rates for funding, a shortage of flight opportunities, de-selection of flight experiments, and a recent 5% cut to all ongoing OBPR investigations. Such practices discourage new investigators from applying to the program and alienate established investigator	Stabilize ISS Research – now that lab is on-orbit NASA should stop the deferral of scientific/experiment hardware funding and stabilize the funding to ensure ISS research facility development and deployment	Biological & Physical Research Advisory Committee (BPRAC)	2000	Yes	Report Response - June '01: Stabilize Research – OBPR is working with Office of Space Flight to produce a realistic, adequately funded program within the overall budget that will be consistent with ISS capabilities. This effort is still underway. In 2002, realistic budgets and funding have been put in place in Code U aligned with current development. Basis of Estimates with EACs were established for each project. Reserves were established at 20% to ensure success.	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
171.	Resources	The Committee noted a number of issues that are negatively affecting PI morale including low selection rates for funding, a shortage of flight opportunities, de-selection of flight experiments, and a recent 5% cut to all ongoing OBPR investigations. Such practices discourage new investigators from applying to the program and alienate established investigator	OBPR should provide sustained support of ground-based and flight research in order to foster the growth of a cadre of investigators who will bring forward the mission of the new enterprise OBPR funding rates must be made competitive with those of other federal agency	Biological & Physical Research Advisory Committee (BPRAC)	2000	No	PI Morale – Funding for grant programs is approximately constant in inflation-adjusted terms. Growth of the budget will require very good arguments. OBPR is actively working growth-fostering strategies. Mr. Golden made the commitment before Congress that the Enterprise would have to grow and be enhanced	
172.	Resources	The Committee noted a number of issues that are negatively affecting PI morale including low selection rates for funding, a shortage of flight opportunities, de-selection of flight experiments, and a recent 5% cut to all ongoing OBPR investigations. Such practices discourage new investigators from applying to the program and alienate established investigator	Research Vision Support – NASA should improve its grants management service in: (a) stability and magnitude of funding, (b) streamlining its review procedures, (c) firm commitment to timelines for releasing NRA's, funding and activation of grants, and (d) improving its relationship with academic and commercial grants management offices	Biological & Physical Research Advisory Committee (BPRAC)	2000	No	Research support – OBPR is reviewing its grants process and will brief the Committee on the results at the next meeting. NASA has an active effort underway Agency-wide to improve its interactions with academic institutions.	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
173.	Resources	The committee expressed concerned focused on protecting and restoring the ISS research budget, the reductions impact on various disciplines, effect of cancelled or delayed research facilities and impact of 3-person crew	OBPR develop an interim program strategy for lower cost research initiatives. Specifically, measures should be sought to adapt the ISS EXPRESS racks to accept mid-deck lockers that be successfully used for research (on Shuttle). However, use of already available mid-deck lockers is...only an interim solution until such time that integrated research facilities are available	Biological & Physical Research Advisory Committee (BPRAC)	2001	Yes	Shuttle middeck locker payloads were the first payloads launched to ISS in 2001. Many payloads in 2002/2003 are reflight payloads.	2001
174.	Resources	The committee expressed concerned focused on protecting and restoring the ISS research budget, the reductions impact on various disciplines, effect of cancelled or delayed research facilities and impact of 3-person crew	Further NASA should perform a cost-analysis study to determine the feasibility of using such mid-deck locker reconfigurations vs. that of continuing to develop facilities at a slower completion timetable.	Biological & Physical Research Advisory Committee (BPRAC)	2001	No	.	
175.	Safety	There is a lack of safety participation during the user design review process	The hardware developers must become as familiar as possible with the safety requirements and should develop/purchase the necessary expertise to assure that safety requirements and documentation quality are appropriate	Payload Engineering Processing Study Phase A & B	Nov-97	No	Much has been done in the safety area to familiarize the PI/PD with the process. Very few customer concerns currently reported regarding this process	

Appendix D

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
176.	Safety	The number of safety reviews increases when dealing across NASA Centers in two instances. One Center is the PD and another is the Mission Management. The sponsoring center performs a review of the safety packages prior to the submittal to the flight or ground safety review panels	The number of safety reviews should be minimized whenever possible. Where safety reviews are conducted by centers or mission management organizations the safety packages should be formatted identically as required by the intended final reviewer/approver. This will minimize the rework required by the payload hardware developer	Payload Engineering Processing Study Phase A & B	Nov-97	No	Much has been done in the safety area to familiarize the PI/PD with the process. Very few customer concerns currently reported regarding this process. Each Center still has a safety review but not currently an issue.	
177.	Safety	The number and complexity of payloads will increase as the ISS Program matures, and these increases may well overwhelm the PSRP. It is believed that safety expertise either exists or can be readily developed at other NASA centers which could alleviate the anticipated work load and possibly lead to reduced costs for payloads	The ISS Program should continue to seek ways which will allow streamlining the safety review process, including the feasibility of distributing the review process among the NASA Centers	Payload Engineering Processing Study Phase A & B	Nov-97	No		

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
178.	Safety	The workload on the PRSP can be expected to be further increased by the policy, whereby users will not be provided technical support in developing safety compliance data packages. This trend was driven by previous cost reduction efforts. It is felt that technical support such as that implemented on Spacelab missions facilitated uniformity in application of safety requirements and completeness of data packages	Reassess the advisability of NASA providing safety support to the hardware developers	Payload Engineering Processing Study Phase A & B	Nov-97	Yes	PSRP assists payloads coming through the process. Examples are provided. No plans are currently in place to "write" safety documentation for the Payloads Developers, nor are the Payload Developers asking for this assistance.	
179.	Safety	The current safety process is effective but not well understood. It overburdens the user and integration community and with the advent of an additional process for SSF, the impact appears to be increasing. The implementation of safety requirements is open to interpretation, and an open appeal process does not appear to be functioning	Charter a Process Action Team to improve both the current Shuttle and the proposed SSF payload safety assessment and review process. Determine the most effective, efficient, and customer friendly flight and ground payload safety review process.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Have one safety process for ISS and Shuttle, the PSRP process. Have one ground safety processes that is tailored for the individual payloads.	1998

Appendix D

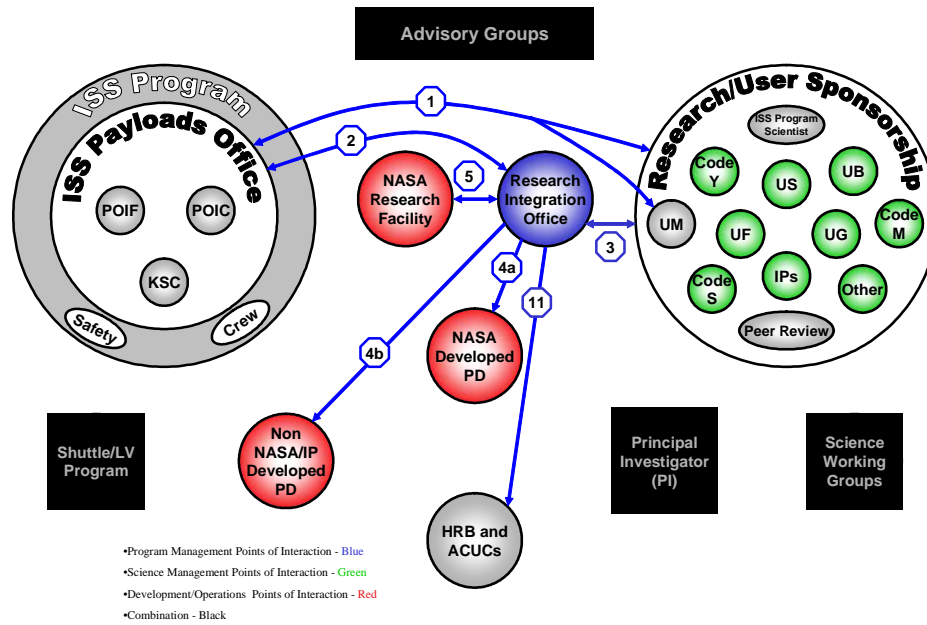
#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
180.	Safety	The current safety process is effective but not well understood. It overburdens the user and integration community and with the advent of an additional process for SSF, the impact appears to be increasing. The implementation of safety requirements is open to interpretation, and an open appeal process does not appear to be functioning	Provide educational products for safety, which discusses the differences between safety & verification, an overview of safety review process, detailed examples of hazard reports, examples of safety requirements interpretations.	Space Station Freedom Continuous Improvement Customer Support Team	Nov-91	Yes	Briefings are done at Phase 0 and website shows safety requirements	1998
181.	Safety	Ground and flight safety data packages should be combined and reviewed together. Much of the information is the same in both packages. This way we could go through one cycle of review and response.	Change the format to combine the inputs utilizing typical PI/PDs that have been through the system in conjunction with the ground and flight safety data package people.	POCAAS	Feb-02	No	PSRP process has been simplified with little customer complaints. ISS and Shuttle process is combined. The ground safety process has also been simplified. PI/PD input says these processes are working.	
182.	Selection	Experiments are selected but not manifested or cannot meet the target manifest	Experiments should not be placed in flight path until they are adequately defined	Payload Engineering Processing Study Phase A & B	Nov-97	No	Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	
183.	Selection	Experiments are selected but not manifested or cannot meet the target manifest	Experiments should stay in the ground-based program until they are mature enough for flight	Payload Engineering Processing Study Phase A & B	Nov-97	No	Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	

#	Category	Finding	Recommendation	Study Source	Time Frame	Implemented	Status	Date Complete
184.	Selection	Experiments are selected but not manifested or cannot meet the target manifest	If there are no identified flight possibilities, either delay the experiment selection until manifest possibilities exist or if already selected, deselect as necessary	Payload Engineering Processing Study Phase A & B	Nov-97	No	Not assigned an actionee and given priority. AA's for Code U & Code M that were advocates left the Agency	

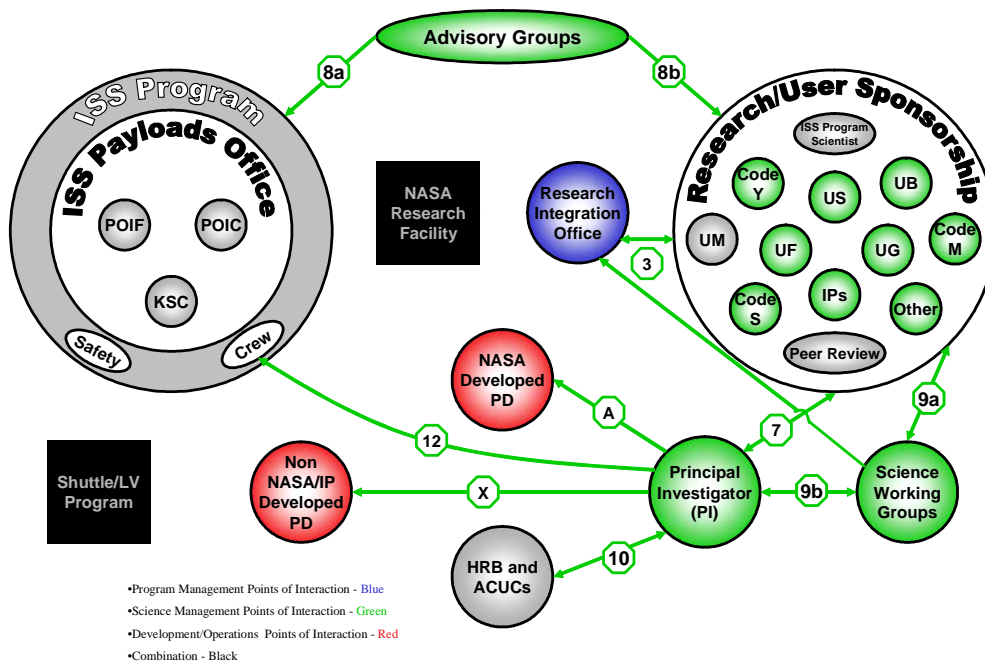
THIS PAGE INTENTIONALLY BLANK

Transaction Diagrams

Program Management Points of Interaction

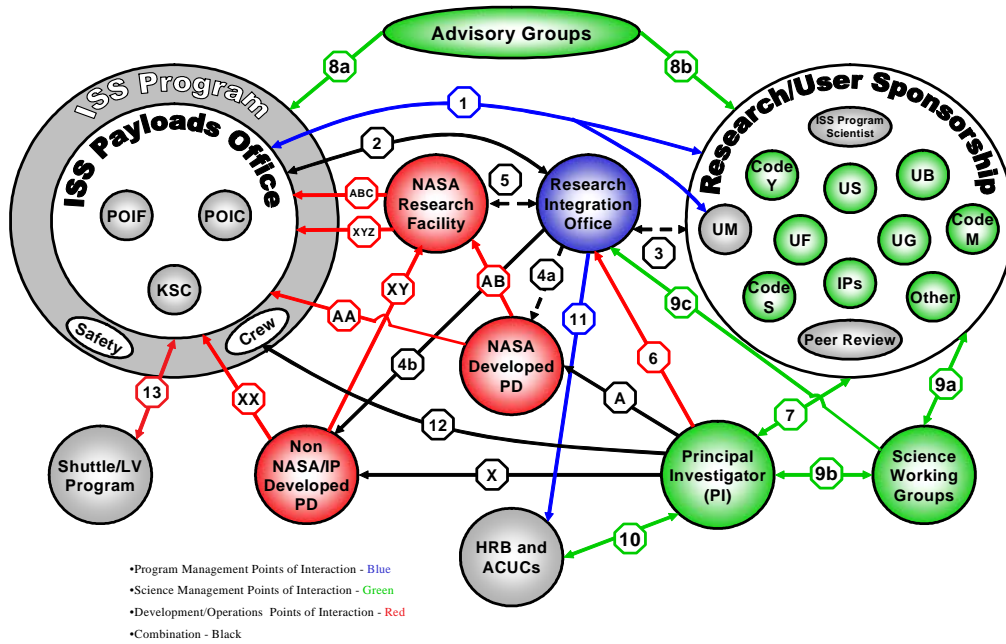


Science Management Points of Interaction

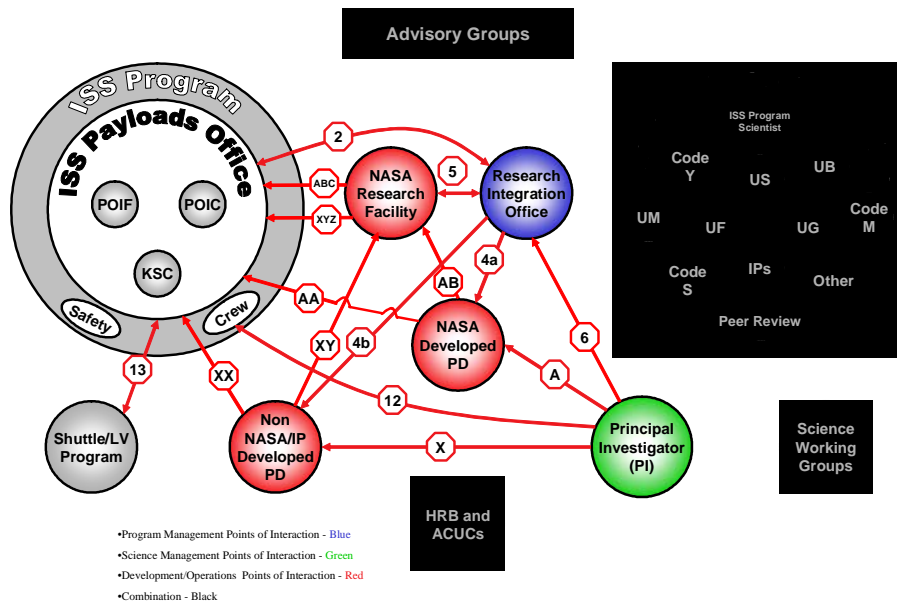


Note: See Appendix F, Points of Interactions Table, for activities associated with each numbered or lettered path on the diagram.

ISS Payloads Points of Interaction



Development/Operations Points of Interaction



Note: See Appendix F, Points of Interactions Table, for activities associated with each numbered or lettered path on the diagram.

Points of Interaction Table

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Space Station Program Control Board (SSPCB)	Program Mgmt Implementation	ISS	All	N/A	ISS Program Manager (JSC)	ISS Program decision authority for baselining flight and increment manifests	- ISS Documents - IDRDs
Program Requirements Control Board (PRCB)	Program Mgmt Implementation	Shuttle	All	N/A	Shuttle Program Manager (JSC)	Program decision authority for baselining mission and manifest	- SSP Documents - FDRD
Payload Control Board (PCB)	Program Mgmt Implementation	ISS	All	2	ISS Payloads Office Mgr (JSC/OZ)	Top level control board for payload management, integration, process, mission implementation and operations decisions.	- CoFR - Payload Verification - Schedule - Cost - Technical Requirements - ICD, PTP, IRD
Payload Development Team	Program Mgmt Science Mgmt Implementation	ISS Shuttle	All	A X AA XX	PM	Proposal evaluations; science requirements definition; investigator hardware development, test and operations; and data conduit to OZ.	- SRD - Proj Plan -Research Apparatus -Data
Integration Control Board (ICB)	Program Mgmt Implementation	Shuttle	All	AA XX ABC XYZ	Flight Manager (JSC)	Program decision authority for dispositioning changes to flight specific requirements	Flight specific changes
Research Planning Working Group (RPWG)	Implementation	ISS	All	1 2 13	RPWG Chair (JSC/OZ5))	The RPWG integrates and manages multidisciplinary and international research resource requirements and objectives for the purpose of optimizing the integrated research return from the International Space Station (ISS).	Submission of Annex 5 to inputs at PMIT to PCB, consolidation of RIO input.

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Flight Assignment Working Group (FAWG)	Implementation	Shuttle	All	1	Customer & Flight Integration Manager (JSC)	Conduct manifest analysis	FAWG Planning Manifest
Science Concept Review (SCR) (or Phase Control Bd @ ARC)	Science Mgmt	ISS Shuttle	Definition	A X 3 4a 4b 7	PI/PS	To address the science requirements, need for microgravity, review engineering feasibility issues, and review carrier options; positive results would provide ATP for flight and hardware definition.	Draft Science Requirements Document (SRD) and ATP Letter
Requirements Definition Review (RDR) (or Phase Control Bd @ ARC)	Science Mgmt Implementation	ISS Shuttle	Definition	A X 3 4a 4b 7	PD/PS	To baseline the science requirements, address any science and engineering issues from SCR, and to baseline carrier options. Positive results would provide ATP for flight hardware Development.	Baseline Science Requirements Document (SRD), and ATP Letter
International Peer Review Panel	Science Mgmt	ISS Shuttle	Definition	7	ISLSWG Executive Board	Determines the scientific merit of Life Sciences PI proposals.	Proposal/scores/comment
International Technical Review Panel ITR	Science Mgmt	ISS Shuttle	Definition	7	ISLSWG Executive Board	Determines the technical feasibility of Life Sciences PI proposals	Proposal /scores/comment
Institutional Animal Care and Use Committee IACUC	Science Mgmt	ISS Shuttle	Definition	10	Majority vote/chair	Reviews and approves flight and ground proposals using vertebrate animals at institutional level	Proposal Approval letter
Research Facility Development Team	Program Mgmt Implementation	ISS	Definition Implementation	AB XY ABC XYZ 5	PM	Rack level hardware development; payload integration and operations; science data retrieval, archival and distribution.	- Proj Plan - Flt Hdwr - EM Hdwr - Data Sets

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Preliminary Design Review (PDR)	Implementation	ISS Shuttle	Development	AB XY AA XX	PD	To review the preliminary design of the flight hardware and software, baseline the Project Plan, complete draft ICD/VP with carrier, define science, engineering and project issues.	Draft Project Plan; Phase 0/1 Safety Review actions and design solutions identified.
Critical Design Review (CDR)	Implementation	ISS Shuttle	Development	AB XY AA XX	PD	To complete the hardware and software design in preparation for hardware procurement and/or fabrication, baseline ICD/VP, address any science, engineering and project management issues from the PDR.	Final Project Plan; Phase 2 Safety Review Panel actions resolved.
Payload Software Control Panel	Implementation	ISS	Development	AA XX ABC XYZ	ISS Payloads Software Manager (JSC/OZ3)	Review software ICDs, data and integration issues	Software ICD Software Flt Load PDL Software
PIRN Tech Rev (PTR)	Implementation	ISS	Development	AA XX ABC XYZ	ISS Payloads Hardware Manager (JSC/OZ4)	Reviews PIRNs and Waivers	PIRNs & Waivers
Payload Training Strategy Team (TST)	Implementation	ISS	Development	ABC XYZ AA XX	PTST Lead (MSFC FPD)	Coordination with PD on the Development of payload training requirements for crew and Ground Support Personnel.	PDL Training Data Set; Crew and GSP training requirements; Training equipment requirements; Payload instructor requirements; Payload simulation requirements; On-board training requirements.

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Payload Display Review Team (PDRT)	Implementation	ISS	Development	ABC XYZ AA XX	PDRT Chair (MSFC FPD)	Cross-function team responsible for reviewing payload displays to insure compatibility with DGCS standards and operability with payload procedures. Team led by MSFC/FPD. Team responsibilities defined in US PODF Management Plan, SSP 58700, Rev E.	Conducts usability tests on displays and procedures; submits PDRT Report and associated Displays to USPODF Change Board for Baseline
Ground Support Requirements Team (GSRT)	Implementation	ISS	Development	AA XX ABC XYZ	GSRT Chair (MSFC FPD)	Help the PI/PD complete their Ground Data Services Data Sets to ensure proper configuration at the remote scientist site. Requirements integration across increments and verification of funding for services.	Ground Data Services Data Set is in PDL, which the user
Payload Operations Integration Working Group (POIWG)	Implementation	ISS	Development	AA XX ABC XYZ	POIWG Forum Lead (MSFC FPD)	A POIF organized forum for PI's to meeting with POIF/Cadre personnel to discuss pre-increment preparation issues, receive instruction on POIF/POIC processes and procedures and provide feedback to the POIF/POIC.	N/A
Payload Operations Working Group (POWG)	Implementation	Shuttle	Development	AA XX ABC XYZ	Payload Officer (JSC/MOD)	Develop operational documentation	Flight Data File and console documentation
Ground Operations Working Group (GOWG)	Implementation	Shuttle	Development	AA XX ABC XYZ	LSSM (KSC)	Describe ground processing process and requirements for payloads at launch/landing site	OMRSD, TGHR Table, Ground Test Procedures
Payload Safety Review Panel (PSRP)	Implementation	ISS Shuttle	Development	AA XX ABC XYZ	PSRP Chair (JSC)	A formally chartered ISS control panel that decides whether to sign hazard reports or not. Includes panel members from IP orgs.	Safety Data Package, Hazard Reports and Action Item Responses

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Ground Safety Review Panel (GSRP)	Implementation	ISS Shuttle	Development	AA XX ABC XYZ	GSRP Chair (KSC)	The KSC Ground Safety Review Panel (GSRP) will assess the Ground Support Equipment (GSE) design and ground operations.	Safety Data Package, Hazard Reports and Action Item responses.
Payload Training Dry Run (PTDR)	Implementation	ISS	Development	AA XX ABC XYZ	PTDR Lead (MSFC FPD)	Held for each payload or experiment course to prove the readiness of the facilities, instructors, training equipment/products as well as the schedules for meeting All crew-training requirements for that payload or experiment. OBT products will also be certified at this time.	Payload Training Lesson Plans and Courseware
Pre-Ship Review (Flight Hardware Available - (FHA)	Implementation	ISS Shuttle	Development	ABC XYZ AB XY 2 A X 4a/4b 5	PD	Final review of the research apparatus to ensure hardware readiness, including safety, interface and performance by the developing organization's senior management and authorization for shipment to the launch site.	Center level authorization to ship hardware to the launch site.
NASA Flight Animal Care and Use Committee Flight ACUC	Science Mgmt	ISS Shuttle	Development	10	Majority vote/chair	Reviews and approves flight proposals using vertebrate animals at Agency level if the use any NASA asset (shuttle, crew, facility, etc)	Approval Letter
Human Research Multilateral Review Board	Science Mgmt	ISS Shuttle	Development	10	Board Chair Consensus	Reviews and approves flight proposals using human subjects	Approval Letter

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Center Flight Readiness Review Board (FRR)	Program Mgmt Implementation	ISS Shuttle	Development	A,4	Board chair Consensus	Reviews flight readiness of experiment/payload.	Flight Readiness letter
Payload Mission Integration Team PMIT		ISS	Implementation	2 AA XX ABC XYZ	Increment Payload Manager (JSC/OZ2)	Cross-function team responsible for defining and ensuring implementation of utilization integration functions across a flight increment.	Payload integration schedule milestone.
NASA Payload Operations Control Board (NPOCB)	Implementation	ISS	Implementation	AA XX ABC XYZ	NPOCB Chair (MSFC FPD)	Implementation control board subordinate to the PCB that establishes the baseline for, and controls subsequent changes to payload operations and integration related products developed in support of US Partner Payload Operations Integration.	Payload Operations Planning Products.
Payload Operations Data File Control Board (PODFCB)	Implementation	ISS	Implementation	AA XX ABC XYZ	PODFCB Chair (MSFC FPD)	Implementation control board subordinate to the Operations Data File Control Board (ODFCB). It establishes control for the Development, maintenance, and configuration management of the Onboard US PODF and Crew Payload Displays.	US PODF Management Plan and Annexes US Payload Operating Procedures and Displays
Increment Research Team (IRT)	Implementation	ISS	Operations	AA XX	Lead Increment Scientist (JSC)	Small forum for increment specific issues. Comprised of LIS, RPOIS, and LIS rep at MSCF POIF. Deals with issues for baselined manifest	PI/PD data goes to RPO -> RPOIS -> LIS

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
KSC Experiment Processing Team	Implementation	ISS Shuttle	Operations	AA XX ABC XYZ	Customer Integration Manager (KSC)	Physical integration/de-integration of ISSP payloads as well as testing of payload-to-ISS interface..	Interaction with PD to include assistance with offline lab operations and on-line KSC payload testing.
Orbiter Rollout Milestone Review (ORMR) (~L-6 Wks)	Program Mgmt	ISS Shuttle	Operations	2	Launch Integration Manager (JSC)	To assess Orbiter readiness to rollout from the OPF to the VAB.	Review actions and open work.
Launch Package Assessment (LPA) (~L-6 Wks)	Program Mgmt Implementation	ISS Shuttle	Operations	2	ISS Program Manager	ISS assessment of launch package readiness to integrate with the Shuttle vehicle.	Review actions and open work.
Payload Readiness Review (PRR) (~L-5 Wks)	Program Mgmt	ISS Shuttle	Operations	2	ISS/SSP Payloads Director (KSC) & Customer Intergation Manager (JSC)	Assess readiness of the Launch Package for integration with Shuttle Vehicle	Review actions and open work.
Stage Operations Readiness Review (SORR) (~ L-3 Wks)	Program Mgmt Implementation	ISS Shuttle	Operations	2	ISS Program Manager	ISS Program assessment of launch package and on-orbit ISS vehicle readiness	Review actions and open work.
Flight Readiness Review (FRR) (~ L-10 days)	Program Mgmt	ISS Shuttle	Operations	2	OSF AA	Joint ISS & SSP assessment of the Shuttle and ISS vehicle readiness for flight	Review actions and open work.
Pre-Launch Mission Management Review (PMMT) (L-2/1 Days)	Program Mgmt	ISS Shuttle	Operations	2	Launch Integration Manager (MMT Chair)	Address open FRR issues and reaffirm readiness to launch.	

Appendix F

POI Forums, Boards & Teams	Level of Interaction	ISS or Shuttle	Activity Phase	Interaction Path (See Transaction Diagrams, Appendix E)	Decision Maker	POI Function	Products
Investigator Working Group (IWG)	Implementation	Shuttle	Operations	9	Chair Leads Consensus	Information exchange of payloads specific issues	
Space Station Utilization Board (SSUB)	Science Mgmt	ISS	Strategic	1	NASA Chief Scientist	PUP Priority calls for ISS Science	PUP
International Space Life Sciences Working Grp (ISLSWG) Executive Bd	Science Mgmt	ISS Shuttle	Strategic	9a 9b	Chair Leads Consensus	Sets criteria for “passing” scores in determining selection for definition of flight proposals	Letter of selection for “definition” from sponsoring agency
Science or Discipline Working Group (SWG/DWG)	Science Mgmt	ISS Shuttle	Strategic	9a 9b	Chair Leads Consensus	Prepares/approves level II Science and technical requirements documents	Committee meeting minutes & recommendations
Biological and Physical Research Advisory Committee (BPRAC)	Science Mgmt	ISS Shuttle	Strategic	8a 8b	Chair Leads Consensus	Primary Advisory committee for OBPR	Committee meeting minutes & recommendations
Life Sciences Advisory Subcommittee (LSAS)	Science Mgmt	ISS Shuttle	Strategic	8a 8b	Chair Leads Consensus	Primary Advisory committee for UF&UB	Committee meeting minutes & recommendations
Space Station Utilization Advisory Subcommittee (SSUAS)	Science Mgmt Implementation	ISS	Strategic	8a 8b	Chair Leads Consensus	Advises Code U AA on matters relating to the conduct of science on ISS and provides recommendations on ISS research capabilities.	Committee meeting minutes & recommendations

Ongoing Improvement Initiatives

- Relocation of ISS Research Capability Budget to OBPR
- Prioritization Plan For Selection Of OBPR Flight Experiments
 - Will replace the existing allocation based methodology
 - Prioritization based on criteria aligned with strategic plan and roadmaps
- ISS Payloads Office Process Improvement
 - Through focused sessions, the end-to-end integration process has been reviewed and a forward action plan for 2003 is being implemented
 - Systematic customer feedback process has been implemented including post-increment interviews and a customer helpline.
 - Customer satisfaction will be continually monitored to ensure improvements are meeting the needs of our customers
- SSP/ISSP Joint Manifest Planning
 - Formulation of the Joint Resources Planning Working Group facilitates developing the payload manifest by having a working level forum to match available Shuttle resources with ISS utilization up and down mass requirements
- OBPR Reorganization
 - Office has reorganized its internal structure to reintegrate program and science management at Headquarters.
 - Newly created “Program Executives” will provide policy and top-level requirements to the centers and evaluate program and project performance against requirements for the flight hardware they are assigned.
 - Allows greater focus on specific areas of research.
 - The former life science division has been divided into bioastronautics and fundamental space biology and separate commercial technology division been created. OBPR

Program Management Plan

- Establish top level goals and objectives over a multiyear horizon
- Redefining HQ roles and responsibilities and its relationship to the operating elements at the field centers.
- OBPR Strategic Research Plan
 - Will set priorities and direction for scientific investigations, strategic research, and commercial and technologies sponsored by OBPR
 - Implementation of the plan allows flow down of agency’s top-level goals and objectives into specific actions
 - While an investigator will have a need for specific animal sample material/data from a flight experiment, additional unused material/data may be of use to others scientists.

Appendix G

- Source material may also be available from samples used in test/validation of experiment support hardware or tissue/data from previous experiments that is now in storage.
- ISS Science Officer
 - Selection of crew member whose primary function will be to oversee and manage the on-board activities required for NASA investigations.
 - Facilitates real-time interaction between the crew and experimenters regarding in-flight performance of experiments and observed results
- Freedom to Manage Payload Processing and Integration Task Team
 - Identification of ways to improve payload customer's satisfaction with access/use of flight assets (STS/ISS/ELV)
 - Multiple customer paths to flight, lack of on-going access to space, and customer insight into flight assignment process identified as major problems
 - Recommendations being implemented include Centralized information site, std customer feedback process, customer forums, and updating policies for SSP and ISS payload assignment process will help in resolving customers' frustrations
- Establish NGO Institute
 - Extensive NASA study, teamwork, and review led to agreement to establish Non-Governmental Organization Institute
 - Will provide ISS research leadership functions with option(s) for expanding scope to include utilization management early in the evolution
 - Will allow quick response to, and engagement of, the ISS user community

Root Cause Assessment Summary of Why Past Study Recommendations Were Not Implemented

- Priorities
 - Research is not a high priority in the Agency
 - Management is overwhelmed by other problems and concerns, e.g. deployment of ISS
- "Political" Concerns
 - "Political" considerations, e.g. implementation would cause loss of jobs
 - NASA Centers have constituencies that make it difficult to move or reduce programs
- Non-Acceptance
 - Denial that the problems exists (even if the problems were identified in the study)
 - Disagreement with the study conclusions and/or recommendations
 - See study recommendations as "someone trying to tell me how to do my job"
- Lack of Follow-On Planning
 - The senior advocate(s) for the study no longer in position to steer the implementation
 - The study report included no specific implementation plan; no "owner" assigned; no scheduled follow-on reports to management.
 - Some team members were not fully engaged, not able to devote enough time and attention to the study or to follow-on activities
- Change "Too Big"
 - Recommendations require significant organizational and/or cultural changes
 - It needs to be done but "the time is not right yet"

THIS PAGE INTENTIONALLY BLANK

SSUR Red Team I Report

April 9, 2003



SSUR Team Goals

- The team will identify and prioritize the areas within ISS, other related platforms, and Shuttle most needing change to improve research/user community satisfaction and where appropriate propose change strategies that will:
 - Optimize research throughput, including re-flight opportunities, available to researchers
 - Establish a process to allow a nominal 12 month cycle from selection for flight to ready for launch
 - Change the risk philosophy to allow researchers to assume risk for science success or failure
 - Remove impediments to the ISS and Shuttle end-to-end utilization process



Charter for Red Team I

- The following questions should be addressed by Red Team I:
- Do the Team processes and planned products
 - Address the goals stated in the charter?
 - Adequately characterize the current end-to-end Station and Shuttle utilization process?
 - Systematically identify the major problems with the process?
 - Enable the team to prioritize those areas most needing change?
 - Ensure that the change strategies can be developed to address the goals stated in the charter?
- Is the Team schedule reasonable to meet the charter requirements?
- What steps can ensure that the Team forward action plan, after review and approval by senior management, is implemented?
- Red Team I should informally review their findings with the SSUR Team and provide oral and written reports to the Associate Administrators -- Office of Space Flight and Office of Biological and Physical Research



Red Team Members

- GSFC – Dr. John Campbell (Team Lead)
- KSC – Maynette Smith
- MSFC – Dr. Jan Davis
- MSFC – Dr. Ann Whitaker
- HQ Code M – Mike Hawes
- HQ Code N – Debbie Brown
- GRC – Jack Salzman
- JSC – Mike Suffredini
- GSFC – Mike Urban
- JPL – Fred O’Callaghan



Red Team Schedule

Tuesday April 8

8:30 – 9:00 Red Team meets alone (only Mary Sharpe from SSUR Team)

9:00 – 11:00 SSUR Team briefs Red Team

11:00 – 12:00 Red Team discussions

12:00 – 1:00 Lunch

1:00 – 4:45 Red Team discussions

4:45 – 6:00 Red Team informal feedback to SSUR Team

Wednesday April 9

8:00 – 10:30 Red Team Prepares Report

10:30 – 11:30 Red Team Briefs NASA Management and SSUR Team

11:30 – 12:30 Report completed & Adjourn



Summary Conclusions

- The SSUR Team is using a logical, well-structured process that should enable the Team to fulfill its Charter, if:
 - The process is allowed to methodically drive out the answers (i.e., avoid premature conclusions)
 - Some modifications/additions are implemented in the subprocesses (see below).
- The SSUR Charter should be modified
- The data collection process has been thorough and contains the information needed to proceed to the next process steps.
- The Team's characterization (i.e., flow mapping) of the Current Process should be modified to allow for more systematic analyses in subsequent steps.
- Prioritization of the problems should be preceded by the development of "prioritization criteria."
- The generation of solutions, must involve discussions with affected "process owners" prior to evaluation and refinement.
- The schedule is challenging but achievable



Do the Team processes and planned products address the goals stated in the charter?

- Yes, if the charter is modified as recommended below
- Remove “other related platforms.” This job is hard enough for STS and ISS without adding undefined platforms to the mix.
- Insert “**across all Enterprises**” to identify the users as being more than just U or M or ...
- Delete the 12 month cycle and risk goals as being solutions
- Change the research statement to be more general
- Address the ISS Institute



SSUR Team Charter

Charter: The team will identify and prioritize the areas within ISS and Shuttle most needing change to improve research/user community satisfaction **across all Enterprises** and where appropriate propose change strategies that will:

- **Optimize high priority research throughput without sacrificing quality**
- Remove impediments to the ISS and Shuttle end-to-end utilization process
- **Ensure compatibility with the ISS institute**



Red Team Charter Questions

- Do the Team processes and planned products
 - adequately characterize the current end-to-end Station and Shuttle utilization process?
 - systematically identify the major problems with the process?
 - enable the team to prioritize those areas most needing change?
 - ensure that the change strategies can be developed to address the goals stated in the charter?
- Yes, if changes are made to the process as described in the following charts



Identify Utilization Process, including from the PI perspective

- Characterize the end-to-end utilization process from research selection to final report
 - Use a PERT formulation; identify process times, resource needs (e.g., work years), products (external and internal), users of products, and interfaces
 - Identify the critical path, end-to-end
 - Look at different types of payloads: large, small, pressurized and not, different Codes and commercial
- Characterize the end-to-end utilization process from the PI-Team perspective
 - Identify process times, products, users of products, and interfaces, people resources
 - Identify major barriers/inhibitors to efficiency
 - Look at different types of payloads



(The “End to End Process Flow” might be a good starting point)

Identify Major Problems in the Process

- Consider critical path and identify the most time consuming steps
 - For those steps:
 - locate major drivers
 - Identify options for reducing time
 - For those options assess the feasibility of solution by identifying resource and risk trades, involving process owner
- Analyze collected issues to identify historic top problems
 - Correlate to those found in the critical path analysis to eliminate duplication
 - Identify options for reducing/eliminating these problems
 - For those options identify resource and risk trades, involving process owner

→ there may be 10 to 30 resulting problem packets

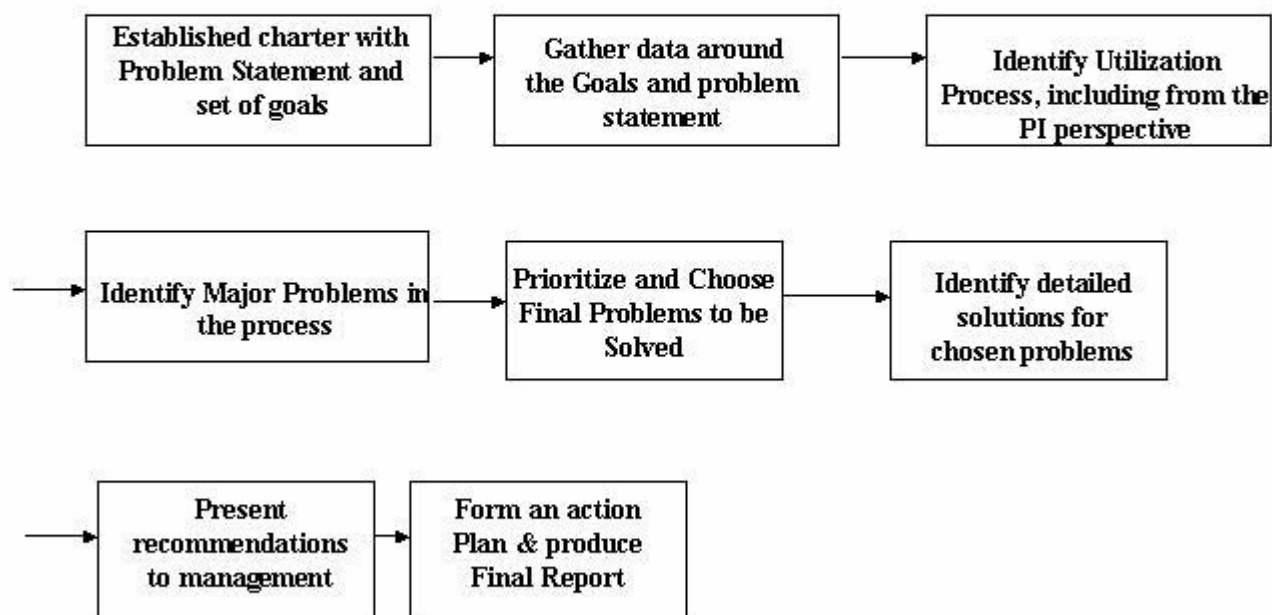


Prioritize and Choose Final Problems to be Solved

- Considering the charter, develop criteria for ranking based on impact and rank the problems
 - Examples of criteria are cost, time, customer expectations
- Considering the solvability of each problem and choose a subset to be solved



Resulting Modified SSUR Team Process



Is the Team schedule reasonable to meet the charter requirements?

- Developing the solutions and trades both at the high level and then at the detailed level for the chosen problems will be challenging
- The SSUR Team has shown their ability to execute sub-teams effectively and that will be required to maintain the current schedule of end of August.
 - 1 to 2 months additional time may be required if the supporting organizations don't respond promptly to the SSUR Team's requests



What steps can ensure that the Team forward action plan, after review and approval by senior management, is implemented?

- Get buy-in by process owners before finalizing an implementation plan
- Maintain the senior level champion at the Code A level
 - The concern of the team about the need for appropriate forcing function for the culture change is valid and will need continual focus.
- Perform focused periodic reviews by senior management with a strong feedback loop
 - Senior Management needs to ensure continuous follow-up on recommendations of team at the highest levels to ensure changes are being made. As seen in the teams/studies reviewed, a lot of the same recommendations made over and over with little or no change.
 - Issues must be worked until closed.
- Treat each change as a project
 - Develop a plan – Statement of Work, Metrics, Schedules, Reviews
- Form a working community between ISS Institute, Management, User Community
 - Form a Board of Directors which includes members of SSUR team and all the disciplines – Science Codes.



Observations

- While the 12-month cycle time is acknowledged as an admirable goal, the entire end-to-end process needs to be reviewed
- The study to date has emphasized pressurized experiments. The process and milestones for unpressurized experiments will be different and should be addressed also.
- The stated goal implies that Shuttle should be addressed not just as a logistical element supporting Space Station, but as a resource for access to space (with ISS as its principal user). The key difference is that there needs to be an element in the process to assure maximum utilization of the Shuttle (and access to space) after ISS requirements are met on a given launch.



Observations

- The team needs to look at the entire process from research selection to paper publishing in order to get maximum benefit from this exercise.
- We acknowledge that there may be more work on PERT and other planning than was given to the Red Team.
- The implementation phase of this project will take a very dogged and persistent effort of follow through.
- A key concern the user community that should be recognized and addressed is the low launch rate of experiments which have reached the first element of the life cycle (research selection) achieving manifest assignment. Too many elements outside the experimenters' control affect probability for manifesting.



Observations

- The SSUR Team and follow-on activities must continue to work aggressively to keep the science community represented in the study.
- There should be a definition in the Glossary of the “Customer”
- The problems assessment and solution development should focus on the Process anticipated after Core Complete (i.e., after the major Research Facilities are functional).
- The Team should use caution in using the current Cycle Time data to identify problems. Many of the extended times between milestones may have been driven by extraneous factors (i.e., lack of flight opportunities, budget reductions) rather than problems in the Utilization Process.
- While negative Customer Feedback is valuable in determining problems, equal attention should be given to examining positive Customer Feedback before crafting solutions. Avoid breaking what is working.



Observations

- Provide to the user community outreach/education of the process as part of the implementation of the study
 - Science Community needs to be made aware of the recent changes made to streamline the process to flight.
- The current list of future investigations should be screened to ensure continuing relevance of the research by the time they are planned for flight.
- Attempts to reduce today's risk adverse culture should involve discussions/negotiations with all those organizations impacted by those actions.



Observations

- SSUR team has done an outstanding job in collecting data and analyzing information (for example fishbone charts, collation of strengths and weaknesses, and product flow).
- SSUR should keep in mind the “big picture” and look at entire end-to-end process of Shuttle and ISS integration, and not just focus on the payload/research utilization. Fold in the OZ streamlining of the payload integration and operations as well as the function of the ISS Institute and then the SSUR can spend its time on the larger problem.





Charter – Red Team 2
Station and Shuttle Utilization Reinvention (SSUR) Team

- Review Change Strategies for end-to-end process improvement proposed by SSUR Team
- Evaluate each change strategy with respect to the following:
 - Is recommended change strategy clear?
 - Will the change strategy, if fully implemented, significantly improve
 - the end-to-end process from the researcher/users perspective?
 - the external research community's perception of the value of NASA's Station and Shuttle Research platforms?
 - Are there change strategies that you would eliminate?
 - Are there change strategies that should be added?
- Identify those change strategies that are most compelling in terms of their value/significance to the user community.
- Provide oral and written briefing to the SSUR Team and the Associate Administrators – Office of Space Flight and Office of Biological and Physical Research – at the conclusion of the meeting

Red Team 2 Membership

Team Lead: Jerry Simpson, NASA HQ

External

- Dr. Charles Czeisler, PI, Harvard Medical School
- Ron Davidson, PI/PD, Space DRUMS, Commercial
- Mark Lee, PD, Orbitec,
- Major Steven McGrath, DOD
- Jeff Alberts, PI, Indiana University
- Dr. Weijia Zhou, PI, University of Wisconsin, CSC Director, Astroculture
- Glynn Holt, PI, Boston University, Aerospace Mechanical Engr. Dept.
- Cila Herman, PI, Johns Hopkins University
- Dr. Peter Cavanagh, PI, Cleveland Clinic
- Dr. Iwan Alexander, PI, CWRU, Nat'l. Center for Microgravity Research

Internal

- Emily Holton - PI, ARC
- Craig Kundrot – MSFC PI
- Robert S Cox, PD, JPL, Code S & Y Payloads
- Bill Foster, PD, GRC, SAMS Project Manager
- Chris Dunker, PD, GSFC
- Nicole Stott , Astronaut Office, JSC

Red Team 2 Wants to Thank

- SSUR Team & Rita Willcoxon, Chair - for an excellent review of ISS and Space Shuttle research and utilization processes, issues & recommended change strategies
- Mary Sharpe – for high quality support in preparation for and during our meeting at NEU/Boston
- Dr. Al Sacco and staff for hosting our evaluation review on-site at NEU

Red Team 2 Evaluation

Summary

- Evaluated all SSUR Team's recommended change strategies & categorized as Top/Middle/Bottom with respect to their value/significance to the user community.
- All change strategies are meritorious and worthy of implementation.
- Combined or adjusted wording of several Top-rated SSUR recommendations.
- Added one new change strategy.
- Identified several additional points for NASA's consideration.

Change Strategies Recommended “Top”

Research Throughput	Emphasis on the Research/User Community
<p><u>Insufficient Utilization Capacity</u></p> <ul style="list-style-type: none"> 1. Increase Budget Stability 2. Alternate/Supplemental Space Access Capability <p><u>Complex Business Structure</u></p> <ul style="list-style-type: none"> 3. Unified Station and Shuttle Utilization Process <p><u>End-To-End Cycle Time Too Long</u></p> <ul style="list-style-type: none"> 4. Maturity of Proposals <p><u>Unclear Research Risk Accountability</u></p> <ul style="list-style-type: none"> 5. Payload Classification System <p><u>End-To-End Cycle Time Too Long</u></p> <ul style="list-style-type: none"> 6. Timeline Tailored to Experiment 7. Manifest Optimization 8. Reduced Process Complexity 9. Concurrent Payload Development and Integration 10. Center to Center Reciprocity 	<p><u>Unclear Research Risk Accountability</u></p> <ul style="list-style-type: none"> 11. Agency Research Success Philosophy 12. Principal Investigator Decision Maker for Research <p><u>Lack of Customer Focus</u></p> <ul style="list-style-type: none"> 13. Transform Agency Culture 14. Improve Research Advocacy 15. More Customer Focused Interfaces <p><u>Complex Business Structure</u></p> <ul style="list-style-type: none"> 3. Unified Station and Shuttle Utilization Process 16. Integrate Utilization at JSC 17. Agency Approach to Commercial Use

Research Throughput

Strategy 2: Alternate/Supplemental Space Access

- Assure space access and earth return capability that is robust enough to accommodate the requirements of the research/user community during nominal times and though significant stand-downs
- Work with the ongoing NASA Integrated Space Transportation Plan (ISTP) study team to assure implementation
 - Establish a practice that decisions about transportation system architecture and design will routinely be based on research user requirements as well as NASA mission needs
 - Ensure that the ISTP includes provisions for adequate crew to conduct ISS research including, as a minimum, dedicated on-orbit crew hours to support requirements defined by the international User Operations Panel (UOP)
 - Assess the value of providing ELV cargo delivery to the ISS thus providing alternate/supplemental space access without additional human space flight
 - Reassess downmass requirements
 - Evaluate concepts for developing a cargo return capability for an ELV cargo system
 - Conduct a cost-benefit trade of these two approaches

Without this, access to space is extremely limited.

Research Throughput

Strategy 3: Unified Station and Shuttle Utilization Process

- Establish an Administrator staff level position to elevate and focus Station and Shuttle **research and** utilization to the highest level within NASA, **accomplished by reallocation/consolidation of existing resources.**
 - Implement a single unified (One NASA) Station and Shuttle utilization process across the agency where requirements and resources are integrated through an agency level strategic plan with allocations and priorities
 - Establish a HQ Space Flight Utilization Board (SFUB) with appropriate membership (Enterprise Codes U, S, Y, M, N, R, etc..) chaired by the new position at Administrator's level
 - Establish integrated Station and Shuttle utilization priorities

Provides focused leadership for ensuring broader optimization and resolving conflicts.

Research Throughput
Strategy 8: Reduced Process Complexity
(Incorporating SSUR Strategy 10 PLUS additional)

- Endorse the current ISS Payloads Office process improvement activity that addresses timing of deliverables, excessive requirements in the integration phase of the cycle, and data deliverables
- Extend the process improvement to the front part of the end-to-end process (proposal selection through payload hardware development)
- Establish a team comprised of Research Integration Offices, HQ Program Executives, **Payload Developer/Principal Investigator**, and a representative from the ISS Payloads Office **to**
 - Perform an assessment of the data requirements on a Payload Developer/Payload Investigator for the upfront phases of the process
 - Share best practices for streamlining and **addressing** requirements and processes that impact the Payload Developer and Principal Investigator

Research Throughput
Strategy 8: Reduced Process Complexity
(Incorporating SSUR Strategy 10 PLUS additional)

- Center-to-Center Reciprocity: Develop policies and procedures (e.g. Inter-Center Agreements and Memorandums of Agreement) that **require** any given NASA Center, or Research Partnership Center, to accept the analysis, technical specifications, review results and certifications of another Center. **This should also be extended to include administrative decisions (e.g., security badging).** (from Strategy 10)
- **PI and staff badging for the duration of their experiment. (new)**
- **Training: endorse development of alternative training methods to reduce dependence on hardware and site specific training (new)**
- **Identify an office (RIO or equivalent) to guide PI's/PD's through the Shuttle/ISS integration process from cradle-to-grave. This office will interface with PI's/PD's on design for human spaceflight integration and safety requirements, acting as a pool of expertise to optimize and create a more efficient design, integration and flight life cycle. (from Strategy 15).**

Simple is better & will increase science output/decrease process cost.

Emphasis on the Research/User Community

Strategy 12: Principal Investigator Decision Maker for Research

- Build flexibility into the system for the Principal Investigator to change and mature the research ideas, objectives, and direction throughout the end-to-end process.
 - Facilitate updates and adjustments to research requirements and focus from payload selection to payload delivery to the launch site to the maximum extent available resources will allow
 - Enable flexibility for Principal Investigator to make changes in research direction and associated decisions regarding research based upon results to date and resources available during on-orbit operations
 - Notify PI immediately if funding is in jeopardy and involve him/her in decisions regarding continuation of flight preparation activities
 - The PI has the decision-making authority in terms of selecting certified flight hardware best suited to meet the science requirements.

Focuses research decision making at the right level.

11

Emphasis on the Research/User Community
Strategy 13: Transform Agency Culture

- Transform the Agency Culture to increase focus and priority on the customer – and partner with the research/user community in accomplishing the Agency’s vision for world-class space research on the ISS and Shuttle platforms.
 - Place added emphasis on Research User Community in Agency high level plans, Mission Statements, Performance Plans of Senior Managers (Agency, Center, and Program), Agency and Center metrics, and Agency priorities including budget
 - Provide significant awards and incentives with input from the research customer to employees who provide outstanding customer support together with Principal Investigator and Graduate Student Investigator for significant research accomplishments
 - Improve crewmember access and research support capability (training time and interface with researchers, crew rotational assignments in research areas, on-orbit communications, researchers in flight crew)

Emphasis on the Research/User Community
Strategy 13: Transform Agency Culture

- Implement stable project funding to optimize science returns
 - Science projects should not be unduly cut to fund NASA offsets
 - Reserves/margins should be sufficient to provide flexibility through a changing flight development period (I.e., manifesting changes, requirements changes, funding changes, etc.) (from Strategy 1)
- Assure uniformity of peer review process, particularly in the life sciences, so that scientific integrity is maintained as projects are selected and integrated into flight.

Need emphasis on research.

Emphasis on the Research/User Community
Strategy 16: Integrate Utilization at JSC

- Integrate Station and Shuttle utilization activities at JSC into a single Program. Establish a phased approach where utilization responsibilities are first consolidated within the Station Program with eventual transition to a single Utilization Program
- The Program would be a single interface and focus for the research/user community to both Station and Shuttle research platforms resulting in a strong research/user community advocate
- The Program would acquire services from Shuttle and Station Programs or future launch service vehicles/providers and maximize utilization capabilities across platforms

Reduces complexity and improves day-to-day operations.

Change Strategies Evaluated as “Middle”

Research Throughput	Emphasis on the Research/User Community
<p><u>Insufficient Utilization Capacity</u></p> <ol style="list-style-type: none"> 1. Increase Budget Stability 2. Alternate/Supplemental Space Access Capability <p><u>Complex Business Structure</u></p> <ol style="list-style-type: none"> 3. Unified Station and Shuttle Utilization Process <p><u>End-To-End Cycle Time Too Long</u></p> <ol style="list-style-type: none"> 4. Maturity of Proposals <p><u>Unclear Research Risk Accountability</u></p> <ol style="list-style-type: none"> 5. Payload Classification System <p><u>End-To-End Cycle Time Too Long</u></p> <ol style="list-style-type: none"> 6. Timeline Tailored to Experiment 7. Manifest Optimization 8. Reduced Process Complexity 9. Concurrent Payload Development and Integration 10. Center to Center Reciprocity 	<p><u>Unclear Research Risk Accountability</u></p> <ol style="list-style-type: none"> 11. Agency Research Success Philosophy 12. Principal Investigator Decision Maker for Research <p><u>Lack of Customer Focus</u></p> <ol style="list-style-type: none"> 13. Transform Agency Culture 14. Improve Research Advocacy 15. More Customer Focused Interfaces 18. <i>Comprehensive hardware catalog.</i> <p><u>Complex Business Structure</u></p> <ol style="list-style-type: none"> 3. Unified Station and Shuttle Utilization Process (presented earlier) 16. Integrate Utilization at JSC 17. Agency Approach to Commercial Use

15

Research Throughput

Strategy 1: Increase Budget Stability (Remainder)

The issue is R&D funding stability more than budget stability.

- Develop and implement an initiative, starting at the top of the Agency, to increase budget stability at all levels. Candidate areas include:
 - Work with Congress to allocate multi-year budgets for NASA and assure that earmarks are accompanied by additional funding
 - Establish a better overall process for grant management by fully funding selected research proposals and full costing of grants at time of award.
 - Establish a policy that research grant funding will not be reduced once the grant is awarded, with exceptions for lack of performance or significant change in Enterprise priorities..

Research Throughput
Strategy 4: Maturity of Proposals

- Investigation Proposals that are solicited and selected by NASA for flight should be of sufficient maturity to allow for predictable progress to flight
- Selections should be made only if a realistic flight opportunity window can be identified without over-subscription of resources
- Where unique hardware needs to be developed, options within the NRA process should enable the proposer to partner with other scientists and/or a Payload Developer to facilitate mature proposals that include hardware development concept and cost estimate
- Tailor peer reviews beyond initial selection to project maturity and eliminate unnecessary peer reviews, maintaining continuity of review team.

Research Throughput
Strategy 9: Concurrent Payload Development and
Integration

- Conduct a pilot program to determine the feasibility of using concurrent engineering to define, design, develop, and perform integration in a more parallel fashion.
 - Based on existing NASA Design Center models (e.g. JPL, GSFC)
 - Team will consist of: Principal Investigator, Payload Development Team, operations, engineering and Payload Integration Manager

This process may exist; consult existing models, e.g., DoD system level procedure, Space-DRUMS®

Emphasis on the Research/User Community
Strategy 11: Agency Research Success Philosophy

- NASA needs to change the Agency's definition of research success to experimental results that lead to, or which truly change the way humanity lives, works and explores.
- NASA needs to look at research both of a fundamental and applied nature that addresses the needs, present and future, of its constituency.
- It is important that the NASA workforce recognize that an experiment's success has multiple components and no single measurement is adequate. This will require NASA to use the criteria the rest of the scientific community uses in their respective disciplines such as peer reviewed results and patents a measure of mission research success.

Emphasis on the Research/User Community
Strategy 15: More Customer Focused Interfaces (Remainder)

- Provide a structured Agency entry point for all potential research utilization customers regardless of platform, including:
 - identifying the appropriate sponsor
 - customer help desk
 - comprehensive website support.

- **[Incorporated into Strategy 8]** Identify a specific Research Integration Office (RIO) (or equivalent) for all disciplines that will be accountable to the PI throughout the end-to-end research process
 - RIO delegated accountability from the Research Sponsor.
 - RIO assigns a primary interface (with input from the PI) together with a Payload Developer (PD) for the investigation.
 - A dedicated (thru mission life) Payload Integration Team with representatives from each supporting NASA Center with representatives including the PD, JSC Payload Integration Manager (PIM), MSFC Payload Ops Representative, and KSC Launch Services Representative.

Additional New Strategy 18:

Develop comprehensive catalog of existing & certified flight hardware available to the PI's for use in support of their research

- This catalog should contain information on
 - Payload specifications
 - Functionalities
 - Non-confidential technical documentation
 - Flight hardware histories, including problems encountered
 - Points of contact
- The database should be accessible to PI's in the proposal preparation stage as well as to NASA officials.

Time to look at this again.

Not that you asked, but...

- Red Team 2 believes the following additional considerations warrant NASA's attention:
 - **NASA management should encourage the Agency-wide adoption of the International System of units (SI) for science and engineering activities.**
 - Adoption of Soft Metrification (see notes) is mandated in Federal law, Executive order, and DOE order.
 - NASA's Inspector General has made 8 recommendations regarding the transition to the SI system. She said: "NASA must decide if it wants to be a leader or a follower in the transition process". We suggest that NASA should be a leader.

Not that you asked (cont)

- **Use of S.I. metric units facilitates scientific communication (particularly with international partners)**
 - **Consistent use of S.I. units can prevent disasters such as the loss of the Mars Climate Orbiter, where a misunderstanding about units was identified as the “root cause” of the loss.**
-
- NASA Management should encourage annual flight NRA's in all codes to maintain the PI pool and to ensure that prioritization for flight is made from state-of-the-art science.
 - Confirm that NASA's Chief Scientist is responsible for science advocacy within the Agency and if not, add to the position's responsibility.

***THANKS!! To Red Team 2
Members for dedicating the time
and effort to perform this
evaluation so smoothly.
Your cooperation was great!***

*Jerry Simpson, Chair
July 23, 2003*

Summary of Responses to Risk Questionnaires

Questions for Payload Development Group Telecon May 14 - May 16

1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)
4. How do those differ for ground hardware design?
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.
9. What documentation do you require for flight hardware development and research mission success?
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?
11. Who do you feel is accountable for the success of the research experiment?
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?
13. Do any of the reliability requirements apply to the research performance?
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?
17. What do you believe drives the conservative mission assurance policies?
18. If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?
19. Is NASA's mission assurance philosophy and policies driving mediocre research?
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.

Appendix K

Questions for Quality Assurance Group Telecon May 15th at 2:00 – 3:30

1. Do you feel that NASA mission assurance policies and procedures are different from Center to Center. If so, do you believe a common set of standards would be a good idea?
2. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)
3. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?
4. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.
5. How do those differ for ground hardware design?
6. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions
7. What is the testing and analysis philosophy that your Organization has for flight hardware development?
8. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?
9. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.
10. What documentation do you require for flight hardware development and research mission success?
11. What reviews do you require of a PI and or your payload development team in order to ensure mission success?
12. Who do you feel is accountable for the success of the research experiment?
13. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?
14. Do any of the reliability requirements apply to the research performance?
15. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?
16. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?
17. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?
18. What do you believe drives the conservative mission assurance policies?

Question	Answer	Interview-ee (Type)
1. Do you feel that NASA mission assurance policies and procedures are different from Center to Center? If so, do you believe a common set of standards would be a good idea?	Probably not as much as they used to be. Common standards help reduce costs and make life easier for our contractors who support more than one NASA Center. The Assurance Technology Center at GRC will help promote common standards, as will SUNS – the online Standards Update Notification System (http://standards.nasa.gov), SOLAR and PBMA (especially the Knowledge Management System). Finally, a number of applicable policies and procedures have been established through the NASA NPD/NPG system. Examples include: See write up	Quality Assurance
1. Do you feel that NASA mission assurance policies and procedures are different from Center to Center. If so, do you believe a common set of standards would be a good idea?	No. All are following NPG's and NPD's but since they tailor them they might look a little different.	Quality Assurance
1. Do you feel that NASA mission assurance policies and procedures are different from Center to Center. If so, do you believe a common set of standards would be a good idea?	Yes . Attempted to pull everything together under 50431.	Quality Assurance
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	I believe they exist, but they are not clear.	Commercial PD or PI
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	Success criteria are data that is successfully collected so that it can be delivered by PI and can be analyzed by them.	NASA PD
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	No, there is not a defined success criterion. A criterion depends on discipline and nature of research, flight or ground. Thinks there probably should be some criteria. Brad thinks there is a reason why we don't have success criteria because it could stifle science.	NASA PD
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	Historically NASA funded payload principal investigators and developers have determined success criteria of their research project, not NASA. The opportunity to find ways to answer the five OBPR questions will meet NASA's own definition of success. We are very enthusiastic about this new opportunity.	Commercial PD or PI

Appendix K

Question	Answer	Interview-ee (Type)
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	I cannot speak for NASA, but there were a clear set of criteria associated with the PESTO experiment during Increment IV. If so, what is the basis of those criteria? Those criteria were established in the ERD and were established by PI and PI science development team.	NASA PI
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	If we have a set of criteria he doesn't not know what they are. As researcher he has his own set of criteria	Commercial PD or PI
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	NASA does not have defined success criteria. NASA has goals/initiatives/plans for its Programs, and research grants are selected to support those goals. Specific research success is defined by our Principal Investigators and documented within Science Requirements Documents. It's extremely important for the project to work with the PIs to clearly understand the definition of success.	NASA PD
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	NASA does not have defined success criteria. He doesn't think NASA needs one, should be experiment specific.	Quality Assurance
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	Can't respond to that. Doesn't understand how to separate mission success from research success. Quoted an example that a failure of experiment could result in an EVA and now a bigger issue. Quality Assurance responsibility is to ensure study can be conducted as planned and gets the results as planned.	Quality Assurance
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	Not sure if there is a NASA-wide standard for research success. At GRC, each PI is required to establish mission success criteria that are reviewed at the experiment's Pre-Ship Review. Typically, this includes requirements to achieve "minimum success", to be "highly successful" or to be completely or "fully successful".	Quality Assurance

Question	Answer	Interview-ee (Type)
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	No. Success criteria are a function of the experiment and are not universally applied across the agency. There clearly are expectations that in-flight science is conducted as closely possible to that which was proposed and peer-reviewed. It would not be possible to have objective criteria (e.g. 80% germination rate) applied across all scientific experiments and disciplines. Payload Developers define unique payload success criteria based upon the proposed science and mission attributes. Typically, the criteria are based upon experiment objectives, using a "fault-tree"-type flow to define detailed criteria.	NASA PD
1. Do you believe that NASA has a clear set of defined success criteria for research success? If so what is the basis of those criteria?	If there are criteria, the PIs do not know what they are. It seems logical that they exist but perhaps used "in house" only.	Commercial PD or PI
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Yes, at least in the case when experiments are clearly defined as hardware demonstration projects. Hardware demonstration flights are necessary when more complex hardware is required for the research. Even with a hardware demonstration project, some good quality science can still be achieved.	Commercial PD or PI
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	No differentiation between experiment hardware and research performance.	NASA PD
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Not a lot of differentiation between hardware performance success and research performance success. Not clear to him how hardware performance success and research performance differentiate, probably a flaw in the system. Brad says that they have to work very hard on performance verification but could verify the design aspects of hardware to allow the hardware to achieve those science objectives on the ground. Performance requirements involve both science and hardware and hard to differentiate the two.	NASA PD
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	From our perspective, of course!" The system can operate flawlessly throughout the flight yet still only produce non-optimal scientific results because of one-shot flight opportunities. Protein crystal growth conditions in space flight environments are very hard to predict therefore it is imperative that research be done on a multiple flight basis so that the scientific aspects can be refined from one flight to the next to better the scientific results, just as it is done in the laboratory on the ground. The attached chart illustrates the success rate of our research when multiple flight opportunities are employed.	CSC

Appendix K

Question	Answer	Interview-ee (Type)
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	There was a clear separation of success criteria between the hardware and the science components in the PESTO/BPS experiment. However, it should be noted science success was dependent upon successful hardware operation. There were a number of performance thresholds imposed on the hardware that were the basis for the success criteria. The success criteria for science were based on both quantity and quality of data and samples acquired. There was overlap when the science required specimens to be exposed to a certain set of conditions and the hardware testing required that those conditions were met.	NASA PI
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Yes clear differentiation. If researcher gets tied up with right hardware developer then the two get interlaced which is a good thing. Science success is if he gets the data and he's happy with it.	Commercial PD or PI
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Yes. The PI defines the research, and the scientific information that is needed to complete the research. The hardware and software are designed to obtain the necessary data. Research performance success is dependent on the quality and quantity of data received.	NASA PD
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Should be integrated success criteria. Hard to separate the two. Doesn't know how to best answer this question.	Quality Assurance
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Research performance and hardware performance should be identical. Are interlaced. HQ research success is different than hardware performance success is different.	Quality Assurance
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Yes. The hardware/software could work exactly as designed, but the research could fail because the experiment was ill-conceived. Conversely, the experiment/hardware may not work as intended but still produce successful research results.	Quality Assurance
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	Yes. However, hardware performance in itself is not an objective. Some of the [science] success criteria may be directly related to how the hardware performs (e.g. number of images captured of science specimen). Science cannot be obtained without hardware performance; therefore the two are interdependent, yet different.	NASA PD

Question	Answer	Interview-ee (Type)
2. Is there a clear differentiation between research performance success and hardware performance success? If so please describe the difference.	There are two parallel lines of activity, one related to hardware and flight. The other line relates to the research objectives. Hopefully these two lines cross each other so that all objectives are met. However, much of the time these lines have to operate separately in order to gain their independent objectives. In the end, both lines of activity lead to the same objective, which is a successful mission.	NASA PI
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	A formal hardware classification A, B, C, D used to be utilized by NASA but they abandoned the system. This old hardware classification system was a good way to understand NASA's priorities and then determine the necessary level of reliability required for the project. For example, Class A hardware has more reliability requirements where human life is on the line. Class A hardware would be the ISS, shuttle, modules, etc. Class B hardware might be things more like the AAH where reliability is a big concern to NASA because of the animal aspects. As you go down in hardware classification, then the level of quality oversight and reliability should also go down. In turn, the cost of the hardware goes down when the level of oversight and verification is reduced. In all classifications, the safety and interface requirements must always be satisfied independent of the hardware classification. One could ask what is the motivation for the Payload Developer (PD) to build reliable hardware? If a PD continues to build hardware that does not work, then the PD will no longer be in business. Reliability increases cost because highly reliable hardware requires more oversight, testing, and verification than the minimum safety and interface requirements.	Commercial PD or PI
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	1. ?) Do have set of quality and performance standards. It is obsolete now and they do not use.	NASA PD

Appendix K

Question	Answer	Interview-ee (Type)
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	Do have defined criteria for flight hardware. It is part of MSFC documentation, but not a NASA center. He bets there is not a great deal of difference between Centers even though there isn't a defined Agency Classification System.	NASA PD
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	We have an ISO9001:2000 certified quality system at UAB. This quality system has its own processes and procedures that we use for hardware and software development. Also, there are many standards and requirements outside of UAB control that UAB utilizes in hardware/software development in our Center. Here are the common ones we typically use in Space Flight Hardware Development. See Attached List of Documents provided in UAB response. In the past, our Shuttle experiments were classified as Class C type payloads (Small – Low to Medium Complexity). ISS only has 3 levels of Payload Classification (Facility, Pallet/Sub-Rack Complex, and Pallet/Sub-Rack). This classification system results in almost 90% applicability of requirements across all classifications. Because of this simple classification scheme the same requirements that are levied on Facility Class Payloads are also levied on small sub-racks, regardless of complexity.	CSC
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	Not Qualified to Answer	NASA PI
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	As long as reliability of 90% and up. When asked if he could fly sooner with 90% would they take the risk, he said yes	Commercial PD or PI

Question	Answer	Interview-ee (Type)
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	NASA GRC uses the Space Assurance Requirements and Guidelines (SARG) for design of flight hardware. Each project or program then prepares a Product Assurance Plan that invokes the requirements of the SARG. The SARG applies to the design, development, fabrication, assembly, test, and operation of space flight systems and related support equipment. In addition to the SARG, each project follows a review process to ensure the hardware/software design meets the requirements for mission success. Procedures we follow include: Science Concept Formulation – Path to the Science Concept Review, Requirements Definition and Engineering Concept Formulation, and Project Implementation Reviews. Each of these documents defines the review process and content of each review. For ISS projects, we follow flight hardware classification through SSP 50431.	NASA PD
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	NMI 8010 was a great document for doing a level of standardize. ARC doesn't have a formal classification requirement but still use the NMI 8010 philosophy. For reliability they use FEMA. Trying to use PRA. When asked if he thought it would help to have for different classes of payload hardware. He said he thought it would be helpful. Need for it to be tailorable based on payload circumstance.	Quality Assurance
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	No set of standards at MSFC, except for ISS (SSP 50431). Depending on the payload, there are different levels of requirements for mission assurance.	Quality Assurance
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	GRC's primary standard is the SARG, "Space Assurance Requirements and Guidelines". SARG, originally known as SAGE, was based on GSFC's GEVS (General Environmental Verification Specification) document and references higher-level SMA documents. SARG contains a matrix that allows tailoring of SMA requirements depending on the type of payload or experiment (e.g., many more SMA activities are required for an ISS facility, like FCF, than for a glovebox, GAS-can or sounding rocket experiment).	Quality Assurance

Appendix K

Question	Answer	Interview-ee (Type)
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	Standards for hardware design are primarily dictated by vehicle IDD and Flight Safety verification. The Center has established guidelines for risk assessment and mitigation. We use these guidelines/processes to evaluate the experiment design and highlight areas of concern, which may lead to re-design. We classify all of our flight hardware as Class D hardware. Our interpretation of Class D means high risk (experiment success) and low development cost. Efforts are made to provide redundant functionality where possible, but only in areas where the redundant hardware doesn't drive the cost of the system.	NASA PD
3. What standards/requirements does the Center use for design of flight hardware in order to achieve mission success? (Do you have a formal classification (a,b,c,d, etc) for flight research hardware?)	This does not pertain to me. The hardware needs to be reliable and as user friendly as possible; my only concerns about design.	NASA PI
4. How do those differ for ground hardware design?	Ground hardware should not need a classification. The type of ground control hardware should depend upon the project requirements. Synchronous ground controls require an additional piece of flight hardware to be built which increases cost. Asynchronous ground controls are less expensive because the flight hardware can be utilized. Ground controls depend upon project requirements and funding. Duplicating thermal profiles, etc. real-time becomes very expensive.	Commercial PD or PI
4. How do those differ for ground hardware design?	Night and day differences. Depends on what hardware is being used for. Training is flight like and ground is commercial.	NASA PD
4. How do those differ for ground hardware design?	Depends on what you are going to do with the hardware. In his case his ground simulator needs to be flight like for trouble shooting on orbit problems. Need paper trail if a failure occurs, just like with flight hardware. Risk differences between ground and flight. Will buy off the shelf commercial parts for ground look alike, but for flight they may or may not use EEE parts. If we want to use commercial parts Agency Wide. Agency needs a verification plan for how to verify the parts. Also, commercial parts don't get kept up and you may have to pay a lot to get the same parts.	NASA PD

Question	Answer	Interview-ee (Type)
4. How do those differ for ground hardware design?	Ground Based systems do not require the “hardiness” of those systems used in a space environment. Therefore the cost can be greatly reduced by utilizing our in-house inventory, COTS items, less paperwork, etc. In some cases our ground-based hardware is an exact replica of the flight systems, in order to give our customers the same operational characteristics they will utilize on-orbit, in other cases the ground-based system and subsystems will replicate the flight system characteristics, but they are not identical to the flight system.	CSC
4. How do those differ for ground hardware design?	Meets the environmental sets as flight hardware so it can be replicated on flight. Needs to be reliable enough to get through the ground.	NASA PI
4. How do those differ for ground hardware design?	Ground hardware you should only have to show that it will last for flight duration and meets the experiment requirements.	Commercial PD or PI
4. How do those differ for ground hardware design?	Ground hardware that is used with flight hardware development follows the same requirements. Ground hardware that is considered development hardware (e.g. breadboards and brassboards) does not follow the requirements listed above. However, ground hardware is used to prove out concepts and mission success and in some cases can be converted to higher-level models (e.g. engineering models). Ground hardware tests are used to support the flight hardware development process and presented at reviews.	NASA PD
4. How do those differ for ground hardware design?	2. How do those differ for ground hardware design? Relaxed standards. Things driving ground hardware is only ground safety. Quality and reliability has relaxed standards.	Quality Assurance
4. How do those differ for ground hardware design?	JSC-Do not do any assessments for RM&QA for ground hardware. MSFC - Ground hardware depends on complexity of the hardware. HQ – Depends on what hardware is doing.	Quality Assurance
4. How do those differ for ground hardware design?	Microgravity may produce unexpected results both in terms of research results or hardware performance (e.g., floating debris in microgravity could cause a circuit board to fail).	Quality Assurance

Appendix K

Question	Answer	Interview-ee (Type)
4. How do those differ for ground hardware design?	Assuming this question addresses experiment hardware and not support equipment, non-flight qualified hardware may have significant differentiation in design and fabrication, for example, conformal coating of circuit boards, weight and cg distribution, configuration control, etc. Ground hardware design is governed through the ground safety process. The requirements for ground hardware are obviously less stringent than those for flight systems.	NASA PD
4. How do those differ for ground hardware design?	Same parameters. Needs to work reliably and also available for ground testing using same experimental design as flight	NASA PI
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions	Yes. Safety is the process that prevents the hardware from becoming hazardous to anyone or anything. Mission assurance is the process of insuring that the hardware works properly and experiment procedures are followed. Frankly, the PSRP does not care about mission success. They just want to make sure the hardware does not injure anyone or anything. For example, the PSRP does not require the hardware to be thermal cycled to test for cold- solder joints, but this test is a mission success quality assurance test that NASA sometimes requires. The PSRP does not even require data to be submitted, but ARC asked that all verification data be submitted. The PSRP reserves the right to call the PD at anytime and request the information, but they do not require an additional review cycle.	Commercial PD or PI
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions	Blurred in many cases. Cause for confusion. Safety concerns may drive unnecessary increase in MA.	NASA PD
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions	On his team he had two separate people a safety and a mission assurance. Very clear-cut on his team. Activities are separate and distinct.	NASA PD
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions.	Our Mission Safety is concerned primarily with the safety aspects of the flight system, GSE, facilities and software, as well as ground and flight personnel safety. Our mission assurance functions deal primarily with quality control, reliability, and maintainability.	CSC

Question	Answer	Interview-ee (Type)
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions.	I can't speak for NASA, but there clearly was a distinction from the PI perspective. Experiment validation tests in the flight hardware were performed by to determine the ability of the H/W meet the science objectives. Changes to H/W, science procedures, or both, were made where required to increase probability of success, good thing, felt like he was an influence on the changes but not decision maker. The safety issues in experiment development were associated with potential crew hazards (e.g. containment of hazards, sharp edges, and the like). I was not directly involved with development of H/W safety packages, but my perception was that the safety issues were independent of mission assurance.	NASA PI
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions.	Yes. Safety requirements are flowed down from the carrier, and follow a separate process. Mission assurance is implemented through controls of the design, development, verification and operations phases such as configuration management and quality assurance during testing and inspections. Mission assurance focuses on the quality of the hardware/software. A specific example: I have an ISS experiment in development called Constrained Vapor Bubble (CVB). The CVB experiment is basically a heat pipe, using pentane liquid and vapor. A quartz cuvette is filled with pentane and outfitted with a heater on one end and a cooler on the other. We are required to put 1 W into the heater face of the cuvette. The auto-ignition temperature of pentane is 260 degrees C. Safety requires that we not exceed the auto-ignition temperature to prevent a fire hazard. However, we still need to meet the 1 W requirement. Mission assurance guides us to design the hardware so that we can put 1 W through quartz, and at the same time prevent a safety hazard. That's quality!	NASA PD
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions.	Mission assurance includes safety, reliability and quality. They are all integrated.	Quality Assurance
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions.	JSC – have wrestled with this in the PSRP and we sometimes mix reliability with safety at times, the other JSC rep. Said there was a clear distinction in his mind. HQ – there are distinction difference; safety is injuring someone, mission assurance is hardware. They are interlaced is you don't have mission assurance you don't have safety. Safety is top down analysis and mission assurance is bottom up. MSFC - from analytical standpoint there is a black and white between the two, but for everything else	Quality Assurance

Appendix K

Question	Answer	Interview-ee (Type)
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions	Mission assurance could be thought of as a broad term with the objective of mitigating risk to help ensure the mission is successful. In theory, it includes safety. However, since NASA has such a well-established and rigorous safety review process, safety is typically considered separately. With safety as a given, I believe mission assurance is thought of as all other activities (e.g., quality assurance, software assurance, reliability & maintainability, etc.) done to ensure the mission is successful.	Quality Assurance
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions	Yes. Safety measures are put in place to protect the crew and vehicle. Mission assurance is governed by the Class D hardware classification (see answer to #3).	NASA PD
5. Is there a clear differentiation between mission assurance and safety? If so please describe the distinctions.	It has always been incorporated into all our experimental design that safety is always the number one factor. If something has to be omitted, changed, re-designed for safety purposes, then that is number one priority over everything. This has always been accepted by most PIs.	NASA PI
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	The hardware should almost be worn out before it flies.	Commercial PD or PI
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Test out workmanship flaws. Human-in-the-loop drives unique testing. End-to-end testing. Qual unit testing different.	NASA PD
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Test what you fly, fly as you test, and if you change something go back and tests.	NASA PD
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Our testing Philosophy is implemented to verify and validate, in an earth environment, that the overall system and or subsystems will fulfill its stated requirements (i.e. Performance, Scientific, Safety and Vehicle). Our Analysis philosophy is primarily done during the formulation phase of the experiment and is implemented to verify that the system definition and performance characteristics will adhere to the Project requirements.	CSC

Question	Answer	Interview-ee (Type)
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	I'm Not qualified to address H/W development aspects. Development of science procedures for flight involved testing the procedures in the lab, then implementing them in flight H/W. There were a total of four tests in high fidelity flight or flight-like H/W prior to actual launch.	NASA PI
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Don't feel that too there are too many tests. Test runs with the hardware are very important. Can't really do too much testing. Doesn't do any hardware development at his lab. They get hardware from NASA or others. Do a little hardware development but not very much for ground.	Commercial PD or PI
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Requirements and guidelines are provided in the SARG, and that's what we use in flight hardware development. The organizational philosophy is to test what you can, and test to verify analyses.	NASA PD
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Test what you fly and fly what you test.	Quality Assurance
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	JSC – Has no requirements for experiment hardware; MSFC – depends on hardware, complex and cost of hardware. Gravity probe B will analyze and test to death; something in a glove box not as much testing because he can bring it back. No formalized way to agree on the risk level between developers and sponsoring organization. Seems that it is being done on cost today.	Quality Assurance
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Analysis can be used for verification, but testing is considered to be a more conservative approach.	Quality Assurance

Appendix K

Question	Answer	Interview-ee (Type)
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	Where practical, during the design process, prototype hardware is built and functionally tested with biological specimens to assure biocompatibility. Following final design and flight hardware fabrication, a design validation test is conducted to assure hardware meets its range of specifications. The hardware is then placed under configuration control. A payload verification test is conducted to match flight protocols. No changes are to be made following the final verification test w/o re-testing.	NASA PD
6. What is the testing and analysis philosophy that your Organization has for flight hardware development?	We do not design or build hardware but do often interact with hardware builders to make equipment more useful to the PI, if possible. But we do not have the time or expertise to get too involved with hardware; all of our time is better utilized with the research and carrying out the experiments with the hardware available.	NASA PI
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Only when it clearly has the responsibility of insuring the taxpayer's dollars are being spent wisely. Otherwise, it should intentionally make sure the world knows it is not directly responsible for its success. NASA could increase the science output by conducting more, smaller experiments than fewer larger, expensive experiments. NASA needs to increase the throughput of scientific research because so many variables are outside the control of the project (i.e.- eliminate or avoid objectives that are difficult to achieve).	Commercial PD or PI
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Job of the PD to deliver analyzable data.	NASA PD
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Yes the payload development team feels responsible for the entire success. Depends on the investigation, in this PD's experience he feels responsible more for the hardware, but does feel responsible for overall success. PD's make the final decision, if there is a difference of opinion between PI and PD. PI does have appeal avenues.	NASA PD
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Only in developing the criteria for research selection. This criterion should emphasize scientific benefit and not probability of success. All too often NASA tends to over emphasize probability of successful results in their criteria. This ends up eliminating some exciting research whose technology may be in a stage of infancy.	CSC

Question	Answer	Interview-ee (Type)
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Success in research is never assured. However, I believe that NASA has a responsibility to provide resources and support PI research activities to the extent possible to answer the question being proposed. NASA provided our payload four opportunities to conduct extended tests in the flight hardware prior to flight in order to ensure that it was capable of meeting the science requirements. NASA obtained reports of those tests from both science and H/W development teams and conducted formal post-test reviews with the H/W development teams, NASA management teams, and PI Science teams.	NASA PI
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	It is the PI's responsibility for success of research and the NASA folks help them get there.	Commercial PD or PI
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Yes. Actually, it's the responsibility of both NASA and the science community. Selected flight research is peer reviewed. The responsibility of the science community (peer review) should be to ensure science feasibility. Once the research is peer reviewed, it becomes NASA's responsibility to implement. It's been my experience that PIs do not write good science requirements. It is NASA's responsibility to help the PI write good requirements (that should be our expertise). We can help ensure mission success when we work with the PI to interpret the requirements and provide the necessary information to the scientist.	NASA PD
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	Yes, our job as quality assurance is to ensure that hardware requirements and performance requirements are met to ensure research success.	Quality Assurance
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	HQ – we should do everything we can to ensure success, make sure we select researchers are quality, with solid methodology, MSFC – nothing to add, JSC – nothing to add.	Quality Assurance
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	It may not be NASA's responsibility, but there are at least two drivers which tend to make us more risk-averse and conservative. One is the cost of getting payloads into orbit, and the other is a desire to retain (or recapture) our reputation as a can-do, successful organization. Within cost and schedule constraints, SMA organizations encourage project managers to identify and mitigate significant areas of project risk wherever possible.	Quality Assurance

Appendix K

Question	Answer	Interview-ee (Type)
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	It is NASA's responsibility to ensure the "payload" successfully meets its objectives, but it is the responsibility of the Principal Investigator to ensure the success of the research. In general, during experiment development, risks are identified and mitigated to the most-practical extent. This should not imply that research success and pre-determined outcomes are synonymous.	NASA PD
7. Do you feel that it is NASA's responsibility to ensure research is a success? If so what do we do to ensure that success?	It is the Pls responsibility to ensure the success of the research, working with the Center staff to make the mission and flight possible. NASA must take the responsibility of making the flight possible and working to make the mission successful; however , the PI has to take responsibility for the final success of the research.	NASA PI
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	No. We probably tend to push the envelope, which puts us at greater risk of not being successful.	Commercial PD or PI
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	Not objectives. Yes, implementation or in-flight protocol. Changes to objectives require re-review. Some objectives not possible in flight.	NASA PD
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	Yes, for ISS microgravity environment development, they have leveraged the knowledge to make the research better. This PD's said his experience is no.	NASA PD
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	Yes. Dynamically Controlled Protein Crystal Growth (DCPCG). We originally wanted to grow crystals using a vapor controlled dynamic and a temperature controlled dynamic. At NASA's direction, we spent so much money and took so much time assuring the success of the vapor controlled dynamic experiment that we/NASA could not afford the temperature controlled dynamic experiment.	CSC

Question	Answer	Interview-ee (Type)
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	Not to a significant degree. There have been modifications to protocols and flight procedures in order to reduce risk of failure, but none directly affected the primary experiment design. There were several instances when I approached NASA to modify original science requirements in order to increase the science return of the experiment. Examples included changing plant cultivar to one more suitable for on-orbit germination and changing fixative to provide for biomolecular analysis. NASA concurred with the changes.	NASA PI
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	No. I always keep the PI's end objective in mind when developing flight hardware. If the research objective has been peer reviewed and found acceptable, then it's my responsibility to implement the project to meet that objective. In addition, requirements are developed so that the flight hardware can meet those objectives.	NASA PD
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	He says this is project decision, doesn't believe that quality assurance has done this.	Quality Assurance
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	Doubt that I personally have changed any research objectives. I believe GRC has attempted some experiments that pushed the state of the art and had a relatively high probability of failure (e.g., the ERE sounding rocket experiment comes to mind). While I would like all experiments to be successful, I believe there are factors that are causing us to take more risk. An example is the increased use of COTS due to cost and reduced availability of higher reliability parts. In addition, the radiation environment on ISS coupled with faster, smaller processors are making us more susceptible to SEU on-orbit failures.	Quality Assurance
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	No. We adhere tightly to the original PI's proposal objectives. The experiment requirements are the foundation on which the payload development is based.	NASA PD
8. Do you feel that you have changed a research objective based on your philosophy that research must be success? If so, please give some examples.	Some detail of the objective may have been changed, but the basic objective does not change; otherwise there would be no reason to carry out the flight/mission.	NASA PI

Appendix K

Question	Answer	Interview-ee (Type)
9. What documentation do you require for flight hardware development and research mission success?	For flight hardware development, the two main areas of concern are the safety and the interface verification. The interface changes depending upon where you are flying. For example, the middeck IDD is different than EXPRESS Rack, SpaceHab, MPLM, etc. The safety documentation is different depending upon the type of payload you are flying. Each payload most likely will involve some unique hazard reports. The documentation is different depending on the project. For research mission success, we ask the experimenter to clearly define their research goals and objectives in the contract. In essence, our contract serves as the documentation	Commercial PD or PI
9. What documentation do you require for flight hardware development and research mission success?	1. ERD SRD ISS ICD. Center-directed and not uniform across agency. Oversight by internal S&MA. COFR inputs to engineering, OZ, life sciences directorates at JSC. Can there be a unified form, or can management rely on other directorates for oversight.	NASA PD
9. What documentation do you require for flight hardware development and research mission success?	Documentation requirements are Project Specific and depend on the NASA Research Office or commercial customer. In general, the NASA Research Offices require much more documentation than NASA Space Products Development or a commercial customer. Some specifics of documentation include: See Attached List Provided.	CSC
9. What documentation do you require for flight hardware development and research mission success?	I have provided a 60-day post flight report and will provide a 1-year report to NASA detailing the results of the flight, and how those results compared to the success criteria defined in the ERD. Cooperative Agreement required reports after each test. KSC procurement issue.	NASA PI
9. What documentation do you require for flight hardware development and research mission success?	A lot of documentation before we actually do anything. Would like to see us tie documentation with the testing, and do more in parallel.	Commercial PD or PI
9. What documentation do you require for flight hardware development and research mission success?	Lots. Signed Science Requirements Documents, Project Plan, Product Assurance Plan, ICDs, Verification Plan, Test Plans, Procedures and Reports, Drawings, etc.	NASA PD
9. What documentation do you require for flight hardware development and research mission success?	Documentation/objective evidence to show paper trail and traceability.	Quality Assurance

Question	Answer	Interview-ee (Type)
9. What documentation do you require for flight hardware development and research mission success?	GRC PMs have some flexibility in this regard, but, as a minimum, we usually require a Product Assurance Plan. Many projects also develop a Risk Management Plan as a stand-alone document or as part of another document, like the Project Plan. The project, of course, also develops the necessary safety and verification documentation, as required for Shuttle/ISS missions.	Quality Assurance
9. What documentation do you require for flight hardware development and research mission success?	The following documentation process is followed for all experiment development efforts. The list is in chronological order: a. PI peer-reviewed proposal, b. Experiment Requirements Document (ERD)- (agreement between PI and developer), c. Hardware End Item Specification (EIS) – based on ERD & carrier selection, d. Risk Management Plan, e. Mission operations procedures, f. Detailed ground processing procedures (Quality oversight), g. Design Verification Test plan (detailed functional tests of flight hardware to show compliance with EIS).; h. Final versions of flight integration documentation; i. Document close-out, configuration controlled archiving	NASA PD
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	We insure the PI has performed ground based testing which simulates the experiment profile. We continue performing the ground simulations until the hardware meets the experiment objectives. We do not require any formal reviews of the PIs. Our motivation is success. If we are successful, then our PIs will want to conduct additional research. If we are not successful, then we will not be in business.	Commercial PD or PI
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	PI fully engaged in review.	NASA PD
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	PI participates in all of the reviews. PI is the PD in this case. When asked if PI could skip the PDR if he wanted or if it was part of the contract and he said yes it was required.	NASA PD
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	System Requirements Review (SRR) – In-Process Review #1; Preliminary Design Review - In-Process Review; Critical Design Review - In Process Review #3; Test Readiness Review - with NASA Center Test Facilities; Flight Operations Review - with Vehicle/Integration Org; Integration Readiness Review with vehicle/integration org.; Again, the amount of documentation and formality of these review is project specific. There can be a large difference in requirements for these reviews.	CSC

Appendix K

Question	Answer	Interview-ee (Type)
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	Not sure what he was required to attend. From PI side, I participated in an initial review of the experiment design, a Science Readiness Review (SRR) following the Science Verification Test (SVT), a post-test review following the 10-day-test, a post-test review following the 24-day-test, a post-test review following the Muffler test, and a Mission Readiness Review (MRR) following the Mission Verification Test (MVT). In addition, I have provided quarterly reports to the science management team on all aspects of the associated ground-based and laboratory testing associated with these tests, as well as more exploratory research necessary to develop the experiment. Felt some of the reviews were too expansive and don't concentrate on the science. He wants to be involved in the hardware more up front and he does that to day. Would like more regular interaction with PD team.	NASA PI
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	Number of reviews and waste of time in reviews was more obvious with the larger missions. The same payload reviews were more efficient and effective. Let hardware developer start with requirements and see what he can do and then work with a working model. He doesn't want to spend days and days with hardware developer	Commercial PD or PI
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	The Science Concept Review is the first hurdle for the PI after a peer-reviewed selection. The SCR is comprised of a peer science panel. Its objective is to assure all science feasibility issues have been addressed and recommend whether or not to proceed to the next phase. The Requirements Definition Review also has a science panel and additionally has an engineering review panel. At this review, all engineering feasibility issues have been addressed and the SRD is agreed upon and signed. The SCR and RDR are the only two reviews for the PI. The engineering team progresses through a PDR, CDR, Verification Review, and finally Pre-Ship Review.	NASA PD
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	Typical design reviews. PDR, CDR, etc. Safety and Quality play a role in that review. PI is invited to attend.	Quality Assurance

Question	Answer	Interview-ee (Type)
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	This depends on the project. More complex projects, like FCF, must go through a full series of reviews including SCR, RDR, PDR, CDR, VRR and PSR. Simpler projects often combine reviews. Glovebox projects, for example, may combine the PDR, CDR & VRR into one review.	Quality Assurance
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	Experiment Requirement Document. Science Verification Test. Science Readiness Review. Payload Verification Test. Payload Readiness Review. Hardware design reviews. Program phase reviews. Informal reviews/lessons learned. Crew familiarization/training.	NASA PD
10. What reviews do you require of a PI and or your payload development team in order to ensure mission success?	Testing and evaluation, and repeated as often as necessary. I know this is not easy for a large mission with many PIs and many objectives, but it works extremely well with 3-5 PIs and/or a mission with relatively few objectives.	NASA PI
11. Who do you feel is accountable for the success of the research experiment?	Everyone on the team needs to be accountable for the areas for which they have assumed responsibility. The PD should not be solely responsible for the success of the research because hardware performance is only part of the equation. The responsibility and accountability needs to be shared because otherwise the team will not function as one unit.	Commercial PD or PI
11. Who do you feel is accountable for the success of the research experiment?	1. It depends on who is asking for the accountability. PI, PD, increment team. PD should not let PI fail unnecessarily. Combined responsibility.	NASA PD
11. Who do you feel is accountable for the success of the research experiment?	The Principal Investigator	CSC
11. Who do you feel is accountable for the success of the research experiment?	The PI is ultimately accountable for the success of the research. NASA is accountable for ensuring that the resources to perform that research (e.g. Operational hardware, sample transfer and stowage capabilities, etc.) are available.	NASA PI
11. Who do you feel is accountable for the success of the research experiment?	The PI is accountable. NASA supports.	Commercial PD or PI
11. Who do you feel is accountable for the success of the research experiment?	Ultimately, it's the Project Manager.	NASA PD

Appendix K

Question	Answer	Interview-ee (Type)
11. Who do you feel is accountable for the success of the research experiment?	NASA Project Manager.	Quality Assurance
11. Who do you feel is accountable for the success of the research experiment?	Everyone who supports the project has responsibility for helping to ensure it is successful, but ultimately the PI and the PM are accountable.	Quality Assurance
11. Who do you feel is accountable for the success of the research experiment?	The payload developer.	NASA PD
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	The SHOT Reliability Program for systems is in accordance with MIL-STD-785 supported by MIL-STD-756 for Reliability Modeling and MIL-HDBK-217 for Reliability Prediction. Our requirements were customized for our business.	Commercial PD or PI
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Thermal testing – design validation testing. Hard to separate reliability requirements. Project plans. Unclear reliability standards. CIL utilized at JSC.	NASA PD
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Reliability Requirements are Project specific and in some cases NASA Center or Commercial Company specific. UAB primarily emphasizes NHB 5300.4 in our Flight Hardware Development Programs. This requirement was implemented through years of Space Shuttle hardware development.	CSC
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Science reliability requirements were developed in the laboratory ensures that science results in a given set of conditions, or grown in flight hardware were consistent and repeatable. The criteria were tracked during the development of the flight experiment, as well as during preparation for flight. The PI team set these criteria.	NASA PI
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Has to be at a very high level if at all possible. In some circumstances it has to be at a 100%. Talking about 91% reliable.	Commercial PD or PI

Question	Answer	Interview-ee (Type)
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Reliability requirements are invoked through the SARG. The SARG was created to provide safety, reliability and quality assurance (SR&QA) guidelines and requirements for Glenn space-flight experiments. The document reflects the increased Safety and Mission Assurance (SMA) role in space Programs and Projects and the new NASA Headquarters Policy for Program and Project Management Process and Requirements, NPG 7120.5, including the new assurance requirements for continuous risk management. Finally, the document was updated to include assurance requirements applicable to payloads on the International Space Station. Requirements were generated by the GRC SR&QA organization in conjunction with technical experts from microgravity and the engineering directorate.	NASA PD
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	HQ NPD's and NPG's. ISS 50431 document is intense for Safety and Quality Assurance Document and has become a compliance rather than guideline document.	Quality Assurance
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	JSC – SSP 5043 but don't have people in place to implement it at this time; MSFC – use SSP 50431, or NASA standard 8729.1; HQ – 8720.1 reliability standard.	Quality Assurance
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Again, it depends on the experiment. Typically, simple experiments do very limited work in the area of reliability. Conversely, complex payloads, like FCF and FCF minifacilities, conduct fairly extensive R&M analyses based on reliability & availability requirements that are established by the project in collaboration with the GRC SMA Directorate.	Quality Assurance
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Payload reliability is a function of the hardware's Class D categorization (see question #3). The basic reliability requirements are defined by the experiment's mission success criteria. The payload development team establishes the requirements.	NASA PD
12. What reliability requirements do you work to? What is the basis of those requirements? Who generated those requirements?	Reliability is necessarily high because of the (1) the costs involved and (2) the knowledge that the PI will probably have only one flight, and one opportunity to succeed.	NASA PI

Appendix K

Question	Answer	Interview-ee (Type)
13. Do any of the reliability requirements apply to the research performance?	These requirements apply indirectly. The hardware must work reliably which in turn contributes to the research performance.	Commercial PD or PI
13. Do any of the reliability requirements apply to the research performance?	No. Both are needed.	NASA PD
13. Do any of the reliability requirements apply to the research performance?	Doesn't know how you do that so doesn't think we do that. Hardware performance requirements maximize the research performance.	NASA PD
13. Do any of the reliability requirements apply to the research performance?	No, and they shouldn't. The whole idea of doing an experiment entails risk that what you are doing will not work or will not work as planned. We try to do everything that we can to assure that the hardware and software used by the PI will work reliably. The research performed in the hardware and software is an unknown in terms of reliability in microgravity. In contrast, there is significance ground based research to establish appropriate crystal growth conditions.	CSC
13. Do any of the reliability requirements apply to the research performance?	All the reliability criteria we utilized and implemented were applied to the research. These included consistency of material preparation and consistency of ground based results. These were reviewed and approved by the NASA's science management team at KSC.	NASA PI
13. Do any of the reliability requirements apply to the research performance?	Not specifically, but ultimately they do.	NASA PD
13. Do any of the reliability requirements apply to the research performance?	He can't separate the two in his mind.	Quality Assurance
13. Do any of the reliability requirements apply to the research performance?	I don't believe so. They basically apply to performance of the hardware/software.	Quality Assurance
13. Do any of the reliability requirements apply to the research performance?	No. We do not separate the research performance from the hardware/system performance.	NASA PD
13. Do any of the reliability requirements apply to the research performance?	Absolutely, you cannot improve your chance of good research with poor reliability factors.	NASA PI

Question	Answer	Interview-ee (Type)
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	No. Interface requirements do not drive reliability standards. The interface requirements may drive cost because some interfaces are more involved than others. For example, EXPRESS Rack interfaces are much more involved than SpaceHab interfaces.	Commercial PD or PI
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	Hundreds of human factors requirements. Overhead is tremendous. Gone beyond common sense on human factors. Focus on payloads greater than ISS (GFE/systems hardware). Compare system (checks/ eclss) versus 5700 PVP.	NASA PD
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	Not reliability, believe Center design philosophy drives the reliability requirements.	NASA PD
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	In most cases no, but for cases or systems that may employ Safety Critical Circuits, than the reliability may increase as a result of Safety compliance.	CSC
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	Interface requirements were transparent to our science research objectives. Not qualified to talk about H/W development impacts	NASA PI
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	One of the major impacts from Shuttle to ISS concerning reliability standards was in radiation. For short duration missions, we did not rad harden components or test. We're finding that we need to test, but rad hardening is very expensive. Through the test program, our objective is to find components that don't latch up. Latch ups will impact research objectives! If hardware experiences a latch up, there is no recourse. It's a failure.	NASA PD

Appendix K

Question	Answer	Interview-ee (Type)
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	No. ISS 50431 is a burr.	Quality Assurance
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	Yes it drives to higher reliability standard but not sure it impacts research objectives. HQ – yes it drives to higher reliability standard.	Quality Assurance
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	NASA safety standards mandate that all potential interface hazards are identified and properly controlled. Higher reliability standards may be needed to ensure safety. For example, it may be necessary to use a more reliable control system for an interface hazard to avoid having to perform on orbit maintenance on that system. Not sure this would necessarily impact research objectives, except that safety constraints (and associated reliability requirements) could constrain the scope of experimental parameters and conditions.	Quality Assurance
14. Do the hardware interface requirements for ISS and or Shuttle drive you to higher reliability standards or impact research objectives? If so, what are some examples?	Any unnecessary requirements have the potential of impacting research objectives if it drives the experiment-unique resources outside of what is available. As a hypothetical example, ISS requires payload be capable of withstanding 0 psia without losing safety integrity. This can lead to additional structural mass that may only be accomplished through diminishing replicates or treatments and thus potentially research objectives.	NASA PD
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	Yes. ISS and Shuttle can have very different environmental profiles (EVAs, vibration from thrusters, crew time availability, etc.) It all depends on the microgravity duration that is required. Some experiments gain valuable data from being in microgravity for longer periods of time while others do not. So, if an experiment is put on ISS that can be conducted on STS, then the cost has been increased unnecessarily.	Commercial PD or PI
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	Yes.	NASA PD

Question	Answer	Interview-ee (Type)
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	Safety requirements do drive hardware reliability requirements. Some requirements that are difficult to achieve, could severely impact the science you can do. Implementing the vibration and acoustics and human factors requirements are very difficult to implement and almost impossible to verify.	NASA PD
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	The primary impacts we see are with the unreliable launch dates and mission/increment durations. On 2 of our past ISS missions, we select science that was compatible with the mission criteria. Samples and systems were readied but had to incur extensive launch delays close to flight. This resulted in wasted time and money on sample preparations and hardware refurbishments. Once the system did launch, a change in the return launch date basically doubled the planned mission duration. Since most biological systems have a specific growth life and shelf life, the rate of success can drop dramatically when key criteria change late in the flow and once the payload is in orbit.	CSC
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	The requirement to conduct research with limited space, power, volume and access imposes obvious limitations on the types of research that can be performed. The constraints of space flight require that hypotheses be developed that be tested within those operational limits. The ability to obtain "breakthrough" is more a function of PI's ability to ask and implement a question within those limits than the reliability or safety requirements of ISS or Shuttle	NASA PI
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	No, I don't think so.	NASA PD

Appendix K

Question	Answer	Interview-ee (Type)
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	Obviously, the man-rating for ISS and Shuttle constrain the research that can be conducted from the perspective of safety. Higher risk, potentially hazardous microgravity experiments potentially could be conducted in free flyers that are sufficiently separated from ISS and Shuttle so they do not pose a threat. From the perspective of reliability only, higher risk research experiments are certainly possible. These could be higher risk in terms of design (e.g., using state of the art equipment), greater complexity or in terms of reduced preparatory ground based research. I don't believe NASA would be willing to relax safety constraints on ISS and Shuttle. However, we might be willing to start conducting higher risk research if we establish an objective system and criteria to evaluate risk of failure vs. research payoff.	Quality Assurance
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	Yes, as can be expected and is unavoidable. The management of ISS/Shuttle resources (mass, volume, power, & crew time) often leads to compromises in the experiment configuration/operation. These compromises should not however limit the research from meeting all of its basic science return goals.	NASA PD
15. Do requirements for ISS and or Shuttle impact the research that is planned. Does it lessen the chances for the research to achieve breakthrough results?	In my opinion, the lack of top flight research and lack of "cutting edge" research is not due to anything other than the fact that investigators are not allowed more than one flight and one opportunity to meet their research objectives. If a PI knew that he/she had at the beginning of their NASA project, 2 or 3 opportunities to fly their experiment, the final results would be just as good as if they were working in their own lab environment. If they did not publish quality work after several flights, then the fault lies with the investigator, not with NASA. In addition, although the obvious thought would be that the 2 or 3 flights might be offered over a short period of time, I would prefer to have the flights spread over a reasonable time such as 3-4 years. In that time, each flight experiment could be fully analyzed and adjustments made to the research in order to make the next flight more productive. And today, with genomic arrays, proteomics, real time PCR, knock-out or knock-in animal models, and many other sophisticated techniques, the analysis often requires more time (not less) because of the enormous amount of data generated from one experiment. And techniques and reagents and data analysis methods change over time, so that one always has a more elegant experiment the second time compared to the initial experiment. For example, our ADF quail embryo tissues that were collected in 2001 are still being re-analyzed as new antibodies and new morphometric analyses become available. I do not believe any change in NASA policies will improve the level of scientific return without also making repeatable flights available to the scientific community.	NASA PI

Question	Answer	Interview-ee (Type)
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Yes. Yes. NASA policies are not tailored. They need to be tailored to fit the project.	Commercial PD or PI
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Conservative – yes. Try to tailor. Leeway given to experienced PIs.	NASA PD
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Do not think they are for a manned rated environment.	NASA PD
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Yes, we believe that NASA has conservative mission assurance policies which drives most of the astronomical cost to design, build, integrate, launch and operate an experiment on ISS. However, SPD has a good approach in putting a great deal of the mission assurance risk on the PI or the PD. No one wants the mission to succeed more than the PI or PD. Also, no one knows how to define mission success more than the PI or PD.	CSC
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Yes, but I believe a conservative approach is justified considering the high cost of conducting the research, and the limited opportunities to test a hypothesis on orbit. It is my perception that different programs have different mission assurance policies	NASA PI

Appendix K

Question	Answer	Interview-ee (Type)
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	NASA is conservative, but isn't that why we have more successes than failures? NPG 7120.5 provides the Project Manager the power to tailor requirements. The same policies should not be applied across the board. Tailoring should not be based on PI experience, but on the complexity of the hardware.	NASA PD
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Doesn't believe the policies are conservative they are appropriate. He thinks it is how they are tailor. Some Centers tailor to a point of adding unnecessary. When asked what he would do to put practicality across the Agency. (1. Put classification back in place to formalize across the Agency, 2. Guidance on Verification from JSC what should be documentation and what should be just analysis, maybe a training program that goes along with the interface document.	Quality Assurance
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	MSFC – don't believe we have conservative mission assurance policies. Believe we do tailor. HQ – different people tailor based on events, experience, flight criticality, etc. Different Centers may have different level of conservatism, plus individuals within centers have different levels of conservatism.	Quality Assurance
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	I believe NASA's mission assurance policies are conservative, but they are also generally tailorable and flexible (reference, for example, SARG and SSP50431). I believe that cost and other factors have driven NASA to take greater risk. I believe that applying mission assurance resources selectively to the areas of greatest risk is probably the best way to strike a balance between striving to achieve mission success and minimizing constraints to research plans and objectives.	Quality Assurance
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	Yes. Unsure. Yes. NASA's assurance should come in the form of flexible manifesting of research experiments. One size does not fit all. Integration of payloads should allow for streamlining of integration documentation depending on the payload's complexity. Early assessments of payloads by NASA (e.g. Phase 0 Safety Review) should establish the necessary documentation requirements to allow for proper scope of integration work.	NASA PD

Question	Answer	Interview-ee (Type)
16. Do you believe that NASA has conservative mission assurance policies? Are they too conservative? Do we try to apply the same policies to every research experiment or do we tailor based on experience of PI, complexity of research, discipline, or hardware, etc.?	NASA has been conservative but that was part of the learning process of flying biological research projects. NASA has not been conservative in venturing to fly almost any kind of biology project imaginable.	NASA PI
17. What do you believe drives the conservative mission assurance policies?	This is a big cost driver. NASA has to recognize that not all research requires the same process and that not all good research has to be expensive	Commercial PD or PI
17. What do you believe drives the conservative mission assurance policies?	Cost (financial, resource, opportunity lost) to orbit – risk of failure.	NASA PD
17. What do you believe drives the conservative mission assurance policies?	Man rated drives it.	NASA PD
17. What do you believe drives the conservative mission assurance policies?	We believe that an uninformed press as well as the non-space science community contributes to the conservative mission assurance policies. From a payload developers point of view we believe that NASA's culture of safety consciousness is over zealous when applied to small middeck payloads (i.e. protein crystal growth) that not need to be levied with same requirements of a major payload such as the Hubble telescope.	CSC
17. What do you believe drives the conservative mission assurance policies?	I personally believe the drivers are the high cost of conducting experiments in space, the limited access to space, and the public visibility of experiments in space	NASA PI
17. What do you believe drives the conservative mission assurance policies?	Failures.	NASA PD
17. What do you believe drives the conservative mission assurance policies?	The safety of the crew and the large amount of resources required (physical and financial).	NASA PD
17. What do you believe drives the conservative mission assurance policies?	It has been a learning curve and since each flight and each research objective has been different, the learning experience has to be conservative and moderate.	NASA PI

Appendix K

Question	Answer	Interview-ee (Type)
18. What do you believe drives the conservative mission assurance policies	Not conservative.	Quality Assurance
18. What do you believe drives the conservative mission assurance policies	Don't believe we have conservative mission assurance policies	Quality Assurance
18. If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	It is the way it has always been done. Fear of failure and a CYA mentality. No reward for risk takers. NASA either has to find additional funding or be willing to conduct research with a different mindset. NASA needs to be willing to take more risk with the understanding that sometimes it is not going to work. In the long run, more good quality research will be accomplished. Not all quality research has to be expensive.	Commercial PD or PI
18. If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	Yes and no.	NASA PD
18. If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	Tethered Satellite is an example of yes. But based on how visible and pertinent the flight. He believes we should refly if it is still pertinent science.	NASA PD
18 If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	In some cases yes, in others, no. Depends on the overall project cost. A good example – DCPCG. Took 10 years from MSFC's ATP(1991) to fly, same selection committee selected the OPCG system that is scheduled to fly later this year or early next year.	CSC
18 If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	Not qualified to answer the question.	NASA PI

Question	Answer	Interview-ee (Type)
18 If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	Yes. STS-87 was supposed to have been a 16-day mission but had to come down after the 4th day due to failed fuel cells. NASA turned the Shuttle around within 3 months time to have a successful reflight on STS-94. That's an extreme example, since no PI met their objective. Reflights I've seen have primarily been due to something the PI had seen on the first mission but not explored because it wasn't part of the initial mission.	NASA PD
18. If a research experiment does not meet its objective on the first flight, does NASA allow another flight? If yes give examples of what happened? If no give examples of what happened?	Yes and No. Investigators are given an opportunity to make their case to the research program or the Enterprise. Examples: Tischler, tobacco hornworms. Lewis – requested reflight after STS-78, was not approved. Unknown policy on STS-107. Many times the first flight is not allowed as the experiment is deselected prior to flight.	NASA PD
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	Here again, each situation is unique. If the situation was outside the team's control, then a reflight should be given (the team is the PD, PI, NASA field center, etc.). If the hardware did not work quite as well as everyone would like, then you do not re-fly the experiment. If you want a guarantee from the PD that the hardware will be reflown without additional cost if it does not work, then you need to be willing to pay for the cost of increased hardware reliability (essentially you're paying for a warranty).	Commercial PD or PI
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	Not the only thing (low on driver list). Certain things cannot be done on orbit or with human subjects.	NASA PD
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	No because of mission assurance. However, yes because investigators are shying away from NASA because we change our mind about what our priorities are. We are fickle.	NASA PD
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	Yes, as described in 17 above, it is our opinion that NASA's philosophy and policies limits opportunities for cutting edge research.	CSC
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	I'm not sure what the criteria of "mediocre" science are. The capabilities of the science facilities on orbit, extended time between idea and testing in space, reliability of funding and limited flight opportunities may discourage scientists from proposing to conduct research in space. However, there are many examples of well-defined hypotheses that have been successfully performed in flight	NASA PI

Appendix K

Question	Answer	Interview-ee (Type)
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	No, I don't think so.	NASA PD
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	No. Lack of physical flight resources (crew time, upmass, powered stowage) and the "central planning" approach to manifesting drive mediocre research. Research announcements are poorly defined. Need to investigate results from experiments and utilizing results to identify follow-on critical questions that need to be answered.	NASA PD
19. Is NASA's mission assurance philosophy and policies driving mediocre research?	In my opinion, the lack of top flight research and lack of "cutting edge" research is not due to anything other than the fact that investigators are not allowed more than one flight and one opportunity to meet their research objectives. If a PI knew that he/she had at the beginning of their NASA project, 2 or 3 opportunities to fly their experiment, the final results would be just as good as if they were working in their own lab environment. If they did not publish quality work after several flights, then the fault lies with the investigator, not with NASA. In addition, although the obvious thought would be that the 2 or 3 flights might be offered over a short period of time, I would prefer to have the flights spread over a reasonable time such as 3-4 years. In that time, each flight experiment could be fully analyzed and adjustments made to the research in order to make the next flight more productive. And today, with genomic arrays, proteomics, real time PCR, knock-out or knock-in animal models, and many other sophisticated techniques, the analysis often requires more time (not less) because of the enormous amount of data generated from one experiment. And techniques and reagents and data analysis methods change over time, so that one always has a more elegant experiment the second time compared to the initial experiment. For example, our ADF quail embryo tissues that were collected in 2001 are still be re-analyzed as new antibodies and new morphometric analyses become available. I do not believe any change in NASA policies will improve the level of scientific return without also making repeatable flights available to the scientific community.	NASA PI
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research	No. Two years is still too long.	Commercial PD or PI

Question	Answer	Interview-ee (Type)
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.	Not the driver. Hardware development alone – one year, add on definition, crew training, etc. it cannot be done. Selection to flight – minimum is 13 months. Nominal is about 3 years.	NASA PD
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.	Not for in house developments. Maybe if you go strictly COTS and reduce reliability. One time customer development with lead time on parts you would not see 2 years. If you could leverage off existing design. From science proposal selection given stable budget and schedule he could do in 3 years.	NASA PD
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.	Maybe. The timeliness of flight opportunities is a key factor in making research successful for the space station. Yes a 2-year cycle would be great.	CSC
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.	I'm not sure what the criteria for "cutting edge" research are. Decreasing the time from proposal selection to flight may affect the technology and/or tools used to address a question, but I'm not sure that the "cutting edge" aspect of an untested science question decreases with time.	NASA PI
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.	No. Cutting edge research requires development time. A guarantee of 2 years is a pipe dream. NASA needs to guarantee funding over the time period specified in the Project Plan.	NASA PD
20. If today's risk philosophy were still in place but the time to get experiments into orbit from proposal selection were a guaranteed 2 years would you be able to perform cutting edge research.	Of course. Quicker flights should increase the total number of experiments flown and thus increase the probability that significant research findings could be made.	NASA PD

THIS PAGE INTENTIONALLY BLANK

Acronyms and Abbreviations

A

AA	Associate Administrator
ACUC	Animal Care and Use Committee
AMS	Alpha Magnetic Spectrometer
ARC	Ames Research Center
ATP	Authority to Proceed
ATV	Automated Transfer Vehicle

B

BPRAC	Biological & Physical Research Advisory Committee
-------	---

C

CAIB	Columbia Accident Investigation Board
CAM	Centrifuge Accommodations Module
CD	Center Director
CDR	Critical Design Review
CEF	Change Evaluation Form
CFO	Chief Financial Officer
CoFR	Certification of Flight Readiness
COTR	Contracting Officer Technical Representative
COTS	Commercial Off-The-Shelf
CR	Change Request
CR	Centrifuge Rotor
CS	Civil Service
CSC	Commercial Space Center
CSLM	Coarsening of Solids and Liquids in Microgravity
CSMAD	Center for Space Mission Architecture Design
CY	Calendar Year

D

DDT&E	Design, Development, Test and Evaluation
DOD	Department of Defense
DSO	Detailed Supplementary Objective
DUET	Distributed Usability Evaluation and Testing
DWG	Discipline Working Group

E

ECR	Engineering Change Request
EEE	Electrical, Electronic, and Electromechanical
EF	Exposed Facility
ELV	Expendable Launch Vehicle
EPF	Exposed Payload Facility
ERD	Engineering Requirements Document

Appendix L

ES	Enterprise Scientist
ESA	European Space Agency
EVA	Extravehicular Activity
EVR	Extravehicular Robotics
EXPRESS	Expedite the Processing of Experiments to the Space Station

F

F2M	Freedom to Manage
FAWG	Flight Assignment Working Group
FCF	Fluids & Combustion Facility
FDRD	Flight Definition Requirements Document
FFRDC	Federally Funded Research & Development Center
FHA	Flight Hardware Available
FTE	Full Time Equivalent
FY	Fiscal Year

G

GAS	Get Away Special
GHE	Ground Handling Equipment
GI	Glovebox Investigator
GI	Guest Investigator
GOWG	Ground Operations Working Group
GR&C	Groundrules, Requirements and Constraints
GRC	Glenn Research Center
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
GSRP	Ground Safety Review Panel

H

HBCU	Historically Black Colleges and Universities
HHR	Habitat Holding Rack
HQ	Headquarters
HRB	Human Research Board
HRF	Human Research Facility
HSFUB	Human Space Flight Utilization Board
HST	Hubble Space Telescope
HTV	H-II Transfer Vehicle
H/W	Hardware

I

IACUC	Institutional Animal Care and Use Committee
ICD	Interface Control Document
ICR	Investigation Continuation Review
IDRD	Increment Definition Requirements Document
IP	International Partner
IRD	Interface Requirements Document

ISLSWG	International Space Life Sciences Working Group
ISO	International Organization for Standardization
ISS	International Space Station
ISSP	International Space Station Program
ISSPO	ISS Program Office
ISSRI	International Space Station Research Institute
ISSRC	ISS Research Capabilities
ISTP	Integrated Space Transportation Plan
ITR	International Technical Review Panel
IURC	Interim User Requirements Collection
IV&V	Independent Verification and Validation

J

JEM	Japanese Experiment Module
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center

K

KSC	Kennedy Space Center
-----	----------------------

L

L-	Launch minus
LaRC	Langley Research Center
LIS	Lead Increment Scientist
LPA	Launch Package Assessment
LSAS	Life Sciences Advisory Subcommittee
LSG	Life Sciences Glovebox
LTMPF	Low Temperature Microgravity Physics Facility
LV	Launch Vehicle

M

MDM	Multiplexer/De-multiplexer
MELFI	Minus Eighty-Degree Freezer
MLE	Mid-deck Locker Equivalent
MOA	Memorandum of Agreement
MPCB	Multi-Lateral Payload Control Board
MPLM	Multi-Purpose Logistics Module
MSFC	Marshall Space Flight Center
MSRR	Materials Science Research Rack
MSG	Microgravity Science Glovebox
MUSS	Multi-User Systems & Support

N

NASA	National Aeronautics and Space Administration
NIH	National Institute of Health
NPG	NASA Procedures and Guidelines

Appendix L

NPOCB	NASA Payload Operations Control Board
NGO	Non-Governmental Organization
NRA	NASA Research Announcement
NRC	National Research Council
NSF	National Science Foundation
NSTS	National Space Transportation System

O

OBPR	Office of Biological and Physical Research
OCE	Office of the Chief Engineer
OLPA	Off-Line Processing Area
OMB	Office of Management and Budget
OOS	On-Orbit Summary
ORMR	Orbiter Rollout Milestone Review
OSF	Office of Space Flight

P

P/L	Payload
P3I	Pre-Planned Product Improvement
PAO	Public Affairs Office
PAR	Payload Anomalies Report
PCB	Payload Control Board
PCS	Portable Computer System
PCS	Physics of Colloids in Space
PD	Payload Developer
PDL	Payload Data Library
PDR	Preliminary Design Review
PDRT	Payload Display Review Team
PE	Program Executive
PEB	Proposal Evaluation Board
PERT	Process Evaluation and Review Technique
PHA	Preliminary Hazard Analysis
PI	Principal Investigator
PIRN	Preliminary/Proposed Interface Revision Notice
PIT	Payload Integration Team
PM	Project Manager
PMIT	Payload Mission Integration Team
POCAAS	Payload Operations Concept Architecture Assessment Study
PODF	Payload Operations Data File
PODFCB	Payload Operations Data File Control Board
POIC	Payload Operations and Integration Center
POIF	Payload Operations Integration Function
POIWG	Payload Operations Integration Working Group
POP	Program Operating Plan
POWG	Payload Operations Working Group
PR	Problem Report

PRACA	Problem Reporting and Corrective Action
PRCB	Program Requirements Control Board (SSP)
PRR	Payload Readiness Review
PS	Project Scientist
PSIV	Payload Software Integration Verification
PSRP	Payload Safety Review Panel
PTDR	Payload Training Dry Run
PTP	Payload Tactical Plan
PTR	PIRN Technical Review
PUP	Partner Utilization Plan

Q

R

RDR	Requirements Definition Review
RFI	Request For Input
RFP	Request For Proposal
RIO	Research Integration Office
RPWG	Research Planning Working Group
RPO	Research Program Office

S

S/T/C	Science/Technology/Commercial
S/W	Software
SAA	Space Act Agreement
SAMS	Space Acceleration Measurement System
SAR	Safety Analysis Report
SCR	Science Concept Review
SEM	Student Experiment Module
HSFUB	Space Flight Utilization Board
SHORE	Space Hyper-spectral Ocean Research Experiment
SORR	Stage Operations Readiness Review
SOW	Statement of Work
SPD	Space Product Development
SpaceDRUMS	Space Dynamically Resonating Ultrasonic Matrix System
SPIP	Station Program Implementation Plan
SPN	Software Problem Notice
SPR	Software Problem Report
SRD	Systems Requirements Document
SRM&QA	Safety, Reliability, Maintainability, and Quality Assurance
SSBRP	Space Station Biological Research Project
SSP	Space Shuttle Program
SSPCB	Space Station Program Control Board
SSUB	Space Station Utilization Board
SSUR	Station and Shuttle Utilization Reinvention
STE	Special Test Equipment

Appendix L

STP	Short-Term Plan
STS	Space Transportation System
SWG	Science Working Group

T

TIM	Technical Interchange Meeting
TRL	Technology Readiness Level
TSC	Telescience Support Center
TST	Training Strategy Team

U

UOP	Utilization and Operations Panel
UOTAT	Utilization, Operations, and Training Assessment Team
URC	User Requirements Collection

V

V&V	Verification and Validation
ViTS	Video Teleconference
VP	Verification Plan

W

WBS	Work Breakdown Structure
WG	Working Group
WORF	Window Observation Research Facility

X

Y

Z

Glossary of Terms

Final Report: A milestone gate in the ISS and Shuttle utilization process where: the researcher has received / retrieved all data from the conduct of the research investigation; the researcher has analyzed the data; and, the researcher has submitted the grant (or contract) closeout documentation to the sponsor thus completing out the investigation.

Generic ISS and Shuttle Utilization Process Milestones: (1) Research Selection; (2) Selection for Flight; (3) Manifest Assignment; (4) Readiness for Flight; and, (5) Final Report.

Manifest Assignment: A milestone gate in the ISS and Shuttle utilization process where investigations are prioritized based upon established criteria. Assignments are baselined by the ISS/Shuttle Programs for specific ISS/Shuttle ascent and descent flights.

Payload Classification: Guidelines for payload classification from the NMI 8010.1A include, but not limited to the following, 1) Characterization; 2) typical factors used; 3) achievement of Mission Success Criteria; and 4) estimated relative SRM&QA cost factors:

- **Class A:**

High priority, minimum risk.

High national prestige; long hardware life required; high complexity; highest cost; long program duration; critical launch constraints; retrieval, re-flight or in-flight maintenance to recover from problems is not feasible.

All affordable programmatic and other measures are taken to achieve minimum risk; the highest practical product assurance standards are utilized.

The SRM&QA costs are estimated at 10–15% of project costs.

- **Class B:**

High priority; medium risk.

High national prestige; medium hardware life required; high to medium complexity; high cost; medium program duration; some launch constraints; retrieval/re-flight or in-flight maintenance to recover from problems is difficult or not feasible.

Compromise are used to permit somewhat reduced costs while maintaining a low risk to the overall mission success and a medium risk of achieving only partial success; stringent product assurance standards are utilized.

The SRM&QA costs are 70% of the Class A estimate.

Appendix M

- **Class C:**

Medium priority; medium/high risk.

Moderate national prestige; short hardware life required; high to low complexity; medium cost; short program duration; few launch constraints; retrieval/re-flight or in-flight maintenance to recover from problems may be feasible.

Moderate risks of not achieving mission success are accepted to permit significant cost savings; reduced product assurance requirements are allowed.

The SRM&QA costs are 40% of the Class A estimate.

- **Class D:**

High risk; minimum cost.

Little national prestige; short hardware life required; low complexity; low cost; short program duration; non-critical launch time/orbit; re-flyable or economically replaceable, in-flight maintenance may be feasible.

Significant risk of not achieving mission success is accepted to permit minimum costs; minimal product assurance requirements are allowed.

The SRM&QA costs are 10% of the Class A estimate.

Payload Developer (PD): Project team responsible for unique/sub-rack investigation hardware from project initiation through completion of post flight data analysis and dissemination. PDs are associated with the same organizations as PI, below.

Principal Investigator (PI): Investigator responsible for the research associated with investigations selected for space flight. The PI may also be the Payload Developer. PI's currently come from the following organizations: NASA Centers, International, Non-Profit, Institutes, Commercial Company, K-12 Schools, Academia, and Other Government

Readiness for Flight: A milestone gate in the ISS and Shuttle utilization process where the payload has been designed, developed, integrated and tested to verify safety, interface and performance requirements. The developing organization's senior management authorizes shipment to the launch site and integration with the launch vehicle.

Research Facility Developer: The project team that is responsible for the development of ISS research facility hardware (rack level or pallet level) that accommodates multiple payloads. Facility developers are both from NASA Field Centers, as well as the International Partners.

Research Integration Office (RIO): OBPR Level II Organization with the following role: develops and assures implementation of Level II (LII) science requirements; coordinates and ensures consistency of project plan with PE; integrates individual payloads into RIO-specific manifest inputs to OBPR; day-to-day interactions with LII tactical manifest activities (RPWG) based on LI priorities; single RIO voice at LII

Payloads Control Board for technical issues; provides Center CoFR endorsement; real-time interface with Lead Increment Scientist for science and operational issues; manages use of TSC; manages archive of research data and dissemination of results; implements education and outreach program for area of expertise; manages integrated LII budget and schedule within LI approved milestones; and, manages reserves within FY after Division Director delegation. RIO's are located at the following locations:

- ARC - Fundamental Space Biology;
- GRC - Physical Sciences Research - Combustion and Reactive Systems, Fluid Physics;
- JPL - Physical Sciences Research - Fundamental Physics;
- JSC - Bioastronautics, Physical Sciences Research - Cell Tissue;
- MSFC - Physical Sciences Research - Material Science, Biotechnology; Space Product Development

Research Platforms: Free Flyers or other orbiting space platforms which house and support the conduct of space research. Transfer vehicles such as the Progress, ATV, and HTV provide logistics transfer and are not considered research platforms, but may mitigate payload up mass constraints.

Research Selection: The initial milestone gate in the ISS and Shuttle utilization process where: the researcher has been notified by the Sponsor that their investigation has been selected for potential space flight; an affiliation has been established with the developing organization, be it a NASA Field Center, a Research Partnership Center or another Agency/International Partner; and, the researcher has been subsequently awarded a grant or contract (Commercial researchers use Partnership Agreements or Space Act Agreements).

Research/User Community: The Principal Investigators, and their support elements to include Co-Investigators, graduate students and support contractors, representing science, technology, commercial and educational fields.

Selection for Flight: A milestone gate in the ISS and Shuttle utilization process where: the research has been defined; any hardware feasibility issues have been assessed, resolved and/or mitigated; a carrier (and its interfaces) for the research has been defined; and, a request for flight assignment has been initiated by the sponsoring organization.

Sponsor: The organization that selects, funds and/or facilitates the manifesting of the research on ISS/SSP. Examples include NASA Headquarters, other government agencies, International Partners, and Industry.

THIS PAGE INTENTIONALLY BLANK